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Thar's Gold in Them Thar 23-Year-Old Computers

By Tom Henkel
CW Staff

DULUTH, Minn. — Six 23-year-old IBM computers could prove to be a real gold mine for the U.S. Air Force. Attempts to salvage the first of the six aging processors could yield between $225,000 and $1.5 million worth of precious metals, principally gold and silver, according to preliminary government estimates.

Jim Berret, head of the government's salvage project, said no one really knows how much precious metal can be extracted from the system. There are large quantities of silver (used as solder), gold and platinum (used in connectors) and copper wire. While silver is the most common precious metal in the system, the gold and platinum are the most valuable metals, Berret said.

The processor currently being dismantled is an IBM FSQ-7, better known as the Semiautomatic Ground Environment (Sage) system. It is a first-generation processor designed specifically for the government air defense system. One of the first computers produced, it is a redundant processor employing more than

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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CIA Delivers Promised Data In Support of Inman Claims

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Central Intelligence Agency released its promised report last week describing Soviet efforts to obtain — legally and illegally — large amounts of Western technology, particularly computers and electronics.

The CIA data was delivered to the House Science and Technology Committee as an addition to the recent testimony of Deputy CIA Director Adm. B.R. Inman, who last week announced his intention to leave the government for a job in the private sector this summer.

The committee had called Inman to discuss his suggestion that basic research in advanced technologies should undergo government review before publication to keep sensitive information from aiding Soviet military development.

As Inman promised the committee, the CIA report,

(Continued on Page 9)

Codd Sees Mixed Fate For Going Relational

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Relational data base systems will gain widespread popularity among users of small configurations, but the relational model faces a less certain future in large computing installations, according to IBM Fellow Dr. E.F. Codd.

In an address at the Fourth Annual International Conference on Computer Capacity Management last week, Codd also spoke optimistically about the long-term prospects of data base processors like Britton-Lee, Inc.'s IDM series machines.

In addition, he assured conference attendees that IBM's IMS will remain one of the company's chief strategic offerings "probably through the end of the century."

Widely regarded as the father of the relational data base system, Codd cited re-

(Continued on Page 10)

DEC Unwraps VAX-11/730, Latest Unit in Its 32-Bit Line

By Tim Scannell
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. last week extended its 32-bit VAX systems family downward by unveiling a system featuring an upgraded memory architecture, a single-board communications controller and a built-in Decnet synchronous communications port — a first for the firm.

The VAX-11/730 system is said to be 30% as powerful as DEC's top-of-the-line VAX-11/780, or roughly equivalent in performance to the firm's 16-bit PDP-11/44. It also costs about 10% less than the PDP-11/44, or nearly half the cost of DEC's previous entry-level 32-bit system.

At the same time, DEC announced:

- An updated and enhanced release of its 32-bit Virtual Memory Storage (VAX/VMS) operating system, multiple-copy operating system discounts and a number of other software products — including a VAX version of Bell Laboratories' C language (Page 4).
- Two communications software products, one of which is a protocol implementation for X.25 packet-switching networks in the U.S. and Europe (Page 4).
- A 64K-bit expanded memory capability and a second Unibus I/O channel for the firm's VAX-11/750 computer (Page 5).

The firm also introduced an optional floating-point accel-

(Continued on Page 4)

SPECIAL**REPORT**

Inside — The Race For People Productivity

NAS Unveils CPUs To Rival IBM 4341-2

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. has replaced its two smallest processor lines with a medium-scale mainframe family that reportedly provides up to 35% greater computing power than the IBM 4341 Model Group 2 for a 20% lower price.

Intended as a replacement for the firm's existing AS/3000 and AS/5000 mainframes, the AS/6100 family consists of two members — the AS/6130 and AS/6150. The AS/6130 reportedly provides at least as much, if not more, processing power than the 4341 Model Group 2 depending on the application and computing environment. The AS/6150 is said to outperform its sister system by 25% to 35%.

NAS declined to quantify the performance differences between the two AS/6100 systems and their IBM counterpart. "We expect our latest product line to be significantly more powerful than

(Continued on Page 8)

FCC Says BOCs Should Be Free To Sell Gear

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Bell operating companies should be allowed to offer terminal equipment, intercity services and enhanced computer-based information services, the Federal Communications Commission told U.S. District Court Judge Harold Greene last week.

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Amperif Relational Data Base Machine Introduced for Univac 1100 Systems

LOUISVILLE, Ky. — A relational data base machine that is said to increase the performance and reduce the application development costs of Sperry Univac 1100 series computers has been introduced by Amperif Corp. here.

Unveiled at a recent Univac users meeting, the relational data base machine (RDM 1100) is said to combine hardware, relational data base management system (DBMS) firmware and 1100 series host software into a single integrated package. It is said to be the first commercially available back-end relational data base machine for the 1100 series computers.

By off-loading data base management tasks from the host computer, the device is said to increase the speed of the DBMS functions and the applications and systems tasks remaining in the host processor.

The unit features a relational data model and a high-level query language to decrease applications development costs, a spokesman said. The device provides a stored-command format as well as an interface from higher level languages. No modification of the 1100 series operating system is required, the spokesman said.

The RDM 1100 reportedly can incorporate up to four controllers, each capable of managing as many as four 600M-byte disk drives. By controlling the disk I/O, the unit supervises retention of frequently used data in cache memory and reportedly overlaps seeks with reads and writes, thereby minimizing I/O access times.

The RDM 1100 can be attached to either the 1100 series word channel or byte channel and a single RDM 1100 system can include up to four simultaneous 1100 series host interfaces, the spokesman noted.

Prices for the unit start at $240,000, which includes a minimum configuration of RDM 1100 hardware and firmware, Univac 1100 host software and two disk drives. It is available for delivery in 60 days from the firm at 21345 Lassen St., Chatsworth, Calif. 91311.

Harvester Co. Can Be Carrier

WASHINGTON, D.C. — International Harvester Co. in Chicago was authorized by the Federal Communications Commission (FCC) earlier this month to operate as a resale common carrier. However, a spokesman for the financially troubled auto and agricultural implement maker said the company has not yet decided whether it will use its new authority.

The company now has a four-node, 2,200-port analog network that handles its internal communications but, the spokesman noted, only about one-third of the network's total capacity is used. The nodes are located in Chicago, Philadelphia, San Diego and Memphis, Tenn.

In its application, Harvester said the commercial service would interconnect with AT&T and specialized carriers and offer private-line and Wide-Area Telecommunications Service as well as dial-up service.

Corrections

Page 72 of this week's *Computerworld* went to press with an incorrect headline. The story on the top of the page (which begins on Page 71) states that the board of the Association of Data Processing Service Organizations, Inc. (Adapso) has authorized its CPA Relations Committee to evaluate the merits of a complaint a vendor has against a Big Eight accounting firm. Contrary to the headline on Page 72, Adapso is not investigating any CPA firm.

The article entitled "IBM Predicted to Unveil Local Net, PBX and Replacement for 370s" [CW, April 12] stated a prediction that IBM would ship a 370 replacement next year. The reference made was actually to IBM's 370X front-end processor. A similar error appeared in the article "Doll: IBM Developing Higher-Level Protocols" [CW, April 19].

In the article "TSI Head Cites Ways to Protect Software" [CW, March 29], Ernest E. "Lee" Keet, president of TSI International, was quoted as having said that "trade secret protection can be used . . . if the developer's interest in protection outweighs the employee's interest in using the information in the marketplace." Keet actually explained that public policy issues affecting employee nondisclosure and noncompete agreements balance the employee's interest in using skills acquired to further his career against the damage of exposure to the employer. Keet also noted that "formal definition of a trade secret has been adopted by half the states and all federal jurisdictions."

This Week

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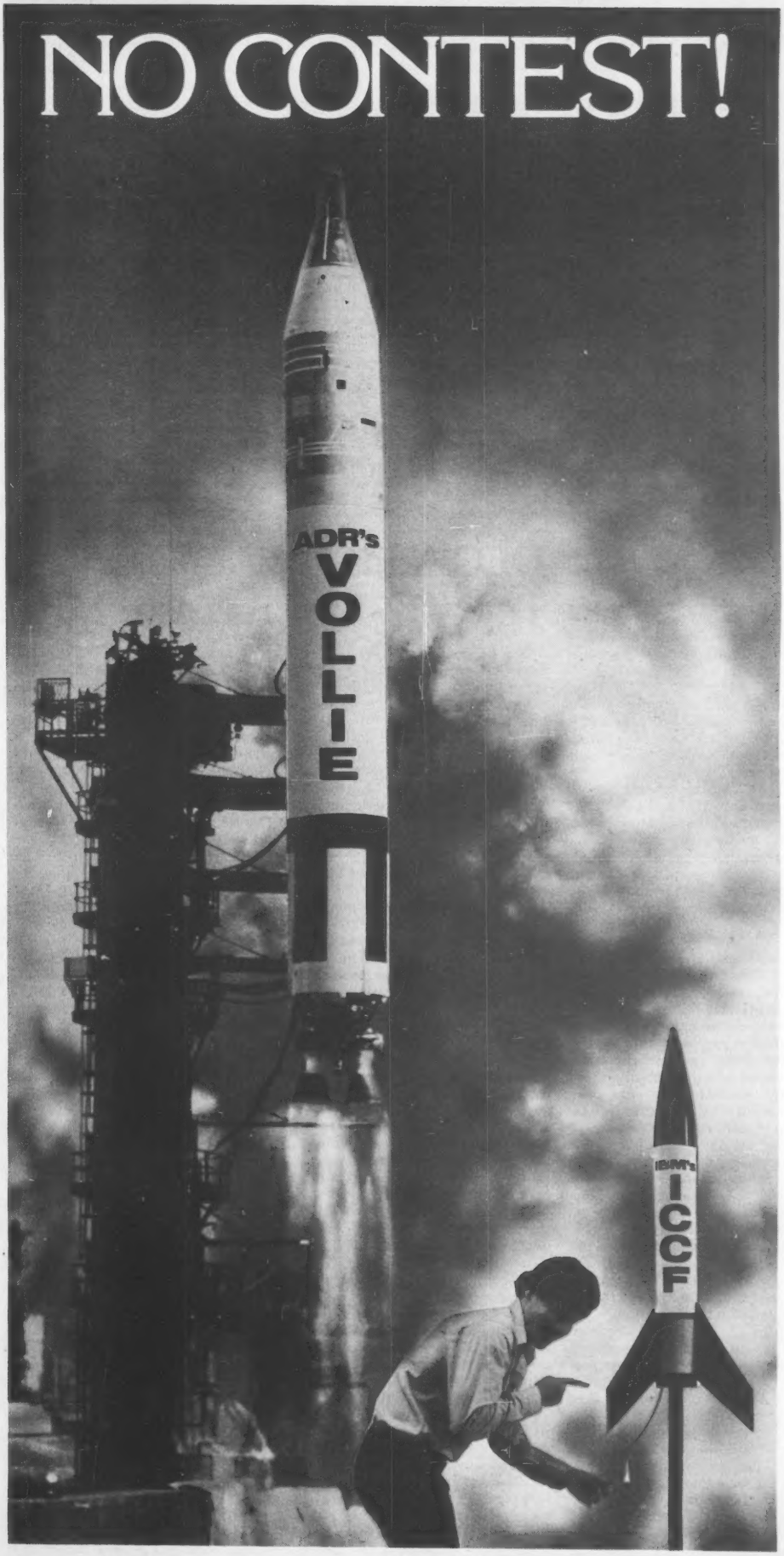

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DEC Enhances VAX/VMS, Unveils 32-Bit Version of C

MAYNARD, Mass. — To support the revamped architecture and flexibility of its newly announced VAX-11/730 system (story on Page 1), Digital Equipment Corp. has enhanced its VAX Virtual Memory Storage (VMS) operating system. The firm also unveiled a 32-bit extended implementation of Bell Laboratories' C programming language and a number of upgraded software compilers.

Version 3 of VAX/VMS not only supports the 11/730's hardware and software, but also reportedly includes enhanced terminal and file-handling capabilities, communications and layered software support and management tools that are geared for system maintenance.

VAX/VMS Version 3 includes queue mechanisms and terminal drivers that are said to have more than twice the performance of those offered with VAX/VMS Version 2. These upgrades are particularly suited for intensive terminal output situations, a spokesman explained. The driver supports split-speed modem operation and block mode input.

Version 3 also has an enhanced records management system that includes increased buffer handling, key compression for shorter single-key Isam files and stream files that support VAX-11 C language file structures, the spokesman claimed.

Other operating system enhancements reportedly include improved error-logging and test packages to better isolate failed components and reduce system downtime, a backup facility for file archiving and restoration and a monitoring utility that allows users to record and play back a history of system performance.

VAX/VMS Version 3 supports all 32-bit systems in the VAX line, according to a spokesman.

For the first time, DEC is packaging its operating system software — in this case the Version 3 — with its rack-mountable 11/730 system. Previously, the license for the operating system software was offered at an additional cost.

Also reportedly for the first time, DEC is offering multiple license discounts for users that have more than one VAX and operating system. For example, a user who buys an 11/730 system for $48,900 will pay $39,500 for the second system — a discount on the operating system software of $9,400.

The VAX-11 version of C is an extension of the programming language developed at Bell Labs and is geared for general-purpose applications ranging from text processing to systems programming.

VAX-11 C can reportedly run or emulate a variety of Bell Labs' Unix routines. In addition, programs written with the language can call modules created with other VMS-supported languages and can use the trace-back and debug features of the VAX debugger, the spokesman said.

VAX-11 Cobol Release

DEC also announced a release of VAX-11 Cobol that reportedly contains features proposed for the next Ansi Cobol standard. These added features include a report writer, multiple program nesting within a single source program, symbolic characters and an external file capability.

Finally, VAX-11 Cobol has been further integrated with the VAX information architecture by implementation of the Cobol data manipulation language for direct access to DEC's data base management system.

The new Cobol release is fully compatible with VAX-11 Cobol Version 1, the spokesman claimed.

Other software announcements last week included:

- A common data definition language addition to the VAX-11 common data dictionary (CDD).
- Version 3 of VAX-11 Fortran, which is said to incorporate simplified execution control for large programs, a cross-reference capability and an Ansi "flagger" for checking code compatibility.

License fees for the software include $7,500 for the VAX-11 C, $13,800 for the enhanced Cobol, $8,700 for the enhanced Fortran and $3,000 for the upgraded CDD.

Software deliveries are scheduled to begin in June, the DEC spokesman said from the firm's headquarters in Maynard, Mass. 01754.

DEC Answers Network Call

MAYNARD, Mass. — Heeding the call of both long- and short-distance networking, Digital Equipment Corp. unveiled a number of communications products last week that are said to be compatible with all computers in its 32-bit systems line.

The communications products include a protocol implementation for X.25 packet-switched networks, both in the U.S. and Europe; a new version of Decnet-VAX, reportedly containing additional hardware support, record management features and simplified networking; and a VAX-supported intelligent line controller for multipoint networks.

The VAX-11 packet-switched implementation (PSI) is said to support GTE Telenet Communications Corp.'s implementation of X.25 in the U.S., the UK's packet-switched system, Transpac in France and Germany's Datex-P. The communications software is said to be DEC's most extensive implementation of the X.25 protocol.

The PSI software reportedly enables host-to-host and terminal-to-host communications with VAX computer systems through implementation of the CCITT X.3, X.28 and X.29 recommendations. The X.29 implementation converts packet data into terminal format and terminal-originated data into packets, a spokesman said.

The VAX-11 PSI user interface reportedly allows programs written in VAX assembly or native-mode languages to exchange data with programs in other computer systems along the packet-switched network. The interface provides all X.25 protocol functions including setup and clearing calls, sending and receiving

(Continued on Page 6)

Characteristics \ System	VAX-11/730	VAX-11/750	VAX-11/780	VAX-11/782
Relative Performance[1]	20	40	62	111.6
Mips[2]	3.5	.70	1.5	2.7
Memory Size in Bytes (Min-Max)	1M-5M	512K-8M	512K-8M	2M-8M
Purchase Price[3] (Memory Size)	$48,900 (1M)	$92,600 (512K)	$154,000 (512K)	$395,000 (2M)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Nsec)	Not Available	320	200	Not Available
Channels (Min-Max)	1	1-5	1-8	1-8
Cache (Buffer) Size	None	4K	8K	8K[4]
Bus Architecture?	Yes	Yes	Yes	Yes
Price per 1M Byte[5] Of Main Memory	$9,000	$13,800	$13,800	$13,800

1. CW estimates are based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equalling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Purchase price includes processor, console, power supply, fully supported operating software and a minimum disk drive configuration.
4. Since the VAX-11/782 is a dual processor, there are 8K bytes of cache memory on each processor.
5. VAX processors are available with either 64K- or 16K-byte memory chips. The 64K-byte memories are available on the 730 and some 750 models at a price of $9,000 per 1M byte. The 16K-byte memories are available for the rest of the VAX product line at $13,800 per 1M byte. A DEC spokesman noted discounts are available for purchases of more than 1M byte of memory.

CW Chart

DEC Adds Low-End CPU To Its 32-Bit Processor Line

(Continued from Page 1)

erator for the 11/730 that is said to speed program execution times.

Unofficially labeled "a VAX in a box," the 11/730 is reportedly the first of DEC's computers to incorporate high-density 64K-bit memory chips that give the system a maximum main memory of 5M bytes. The 32-bit computer can handle up to 24 interactive terminals and, like its systems peers, has an inherent program space of up to 2G bytes.

The VAX-11/730 processor is fully software-compatible with the other members of DEC's VAX systems line — the 11/750, 11/780 and 11/782 — but is completely contained in a 10½-in.-high cabinet. The system stands about 42 in. high, a spokesman said.

The 11/730's single-board, intelligent communications controller provides direct-memory access (DMA) for both multiline asynchronous and synchronous communications, the spokesman noted. It also provides an interface for a line printer or other special-purpose device.

The DMF32 controller is a DMA device containing an asynchronous multiplexer for eight receive-and-transmit lines and offers data rates from 50 bit/sec to 19.2K bit/sec. Two of the controller's lines have a split-speed capability and full modem control, while the remaining six are geared for local terminals.

The controller also includes a single-line synchronous interface primarily designed for intersystem communications. This marks the first time that DEC has offered a built-in synchronous communications port with one of its 32-bit computer systems.

The synchronous port is compatible with the firm's Decnet networking protocol (see related story Page 4) and facilitates system-to-system communications. It also further paves the way for using the 11/730 as more of a distributed processing node rather than just a stand-alone processing system, the spokesman said. The synchronous line supports Synchronous Data Link Control, High-Level Data Link Control and bisynchronous protocols to frame messages, perform cyclic redundancy checks and send messages to and from main memory, he added.

The controller also has a DMA interface for line printers with low-level formatting functions and can act alternately as a 16-bit parallel interface for use with a variety of specialized devices.

Finally, the 11/730 system has an integrated disk controller that reportedly can handle up to 151M bytes of storage, two redundant TU58 tape cartridge drives and a universal power supply that permits both U.S. and European operation via a standard wall electrical socket. The 11/730 can also be fitted with an optional floating-point accelerator for faster program execution. The FP730 accelerator handles single- and double-precision instructions and floating-point data conversion and is said to improve integer multiplication performance.

The 11/730 is available in three configurations: as a rack-mountable processor box, with dual 10M-byte RL02 disk drives or with RL02 and 121M-byte R80 disk drives. The processor costs $28,500, while the complete systems are priced at $48,900 and $59,400, respectively. Basic monthly service charges for the processor only and the systems are $95, $342 and $363, respectively.

All packaged 11/730 systems include a central processor with 1M byte of memory; a DMF32 communications controller; fixed and/or removable disk storage; two RL02 cartridge disk drives; an LA120 Decwriter III console terminal; and the VMS Version 3 operating system with full support, warranty and installation. The optional floating-point accelerator costs $3,995.

The 11/730 is scheduled for delivery next month, the spokesman said. Additional system details can be obtained from the firm's Maynard, Mass., headquarters.

Low-End VAX May Give Run For the Money To 16-Bit Units

By Tim Scannell
CW Staff

MAYNARD, Mass. — While Digital Equipment Corp.'s VAX-11/730 will not replace the 16-bit computers in DEC's product lineup, it might give the firm's older stable of systems a run for the user's money, based on answers given by vendor executives at a press conference here last week.

The entry-level 32-bit computer is said to have about the same performance as DEC's older 16-bit PDP-11/44 computer, but offers more inherent flexibility at about 10% less cost.

While the PDP-11s are not geared to handle a lot of users, the 11/730 can reportedly accommodate up to 24 interactive terminals. The 32-bit system is also said to incorporate 64K-bit memory chips, allowing up to 5M bytes of main memory and has a 2G-byte program addressability as opposed to the PDP-11's 16M-byte capacity.

Also, while the PDP-11s have heavy user saturation and an equally heavy investment in user software, the system's architecture is about 12 years old, making it a prime target for the impact of newer technologies.

Although DEC scoffs at the thought of excessive internal systems competition, it does hint at the possibility. For instance, Lucien R. Philippon, the 11/730's product manager, referred to the 11/730 as "the new backbone of the [computer-aided design/computer-aided manufacturing] CAD/CAM field" — putting it on a collision course with the PDP-11/70, which is now reportedly that industry's favorite.

While Philippon admitted that the 11/730 might be a more attractive alternative to DEC's 16-bit processors for some users, he asserted that the new system will not severely impact the PDP-11 systems line.

DEC will continue to manufacture PDP-11/34, 11/44 and 11/70 16-bit machines just as it has continued to make and sell its virtually antique 8-bit PDP-8 minicomputers, he stated, noting that "people already using 16-bit computers have a software investment to protect."

On the other hand, the 11/730 introduction as a low-priced gateway into 32-bit processing will have some advantages for dyed-in-the-wool 16-bit users.

To keep the old in perspective with the new, DEC may eventually cut prices on its 16-bit computers and related hardware.

Address Changed For Siggraph Data

CHICAGO — The Association for Computing Machinery has announced an address change for people requesting information on the upcoming Siggraph '82 computer graphics conference.

The conference is slated for July 26-30 in Boston.

For information on the conference, contact Siggraph '82, Convention Services Department, 111 E. Wacker Drive, Chicago, Ill. 60601.

VAX-11/750 Updated; Features 64K Chips

MAYNARD, Mass. — In conjunction with its introduction of the VAX-11/730, Digital Equipment Corp. last week introduced an upgraded version of the VAX-11/750 which features 64K-bit chips and has, as a result, reportedly four times its previous memory capacity.

The high-density chips are said to allow up to 1M byte of memory to be packaged on a single board, boosting the VAX-11/750's memory from 2M bytes to 8M bytes. The 64K-bit chip memory is available on a recently announced 11/750 packaged system that includes 3M bytes of memory, an RM05 disk drive and TU77 tape units. The package costs $160,000.

The upgrade may indicate an eventual move to incorporate 64K-bit chips in the memory designs of all 32-bit DEC systems.

"I can see the trend; I can see it happening," Lucien R. Philippon, the VAX-11/730 product manager, said at a recent press conference. "It will be a phased introduction, but it's undeniable."

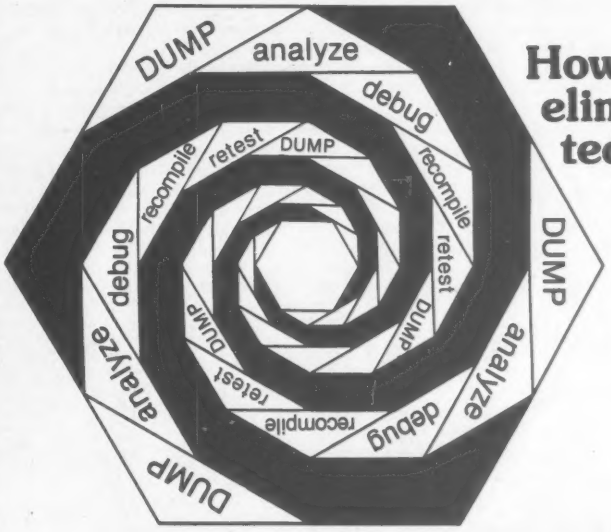
Current VAX-11/750 users can obtain a memory controller and backplane to support any combination of new and existing memory. Memory for the 730 and 750 will be available in 1M- to 4M-byte increments ranging in price from $9,000 to $24,000.

Add-on memory will be available next month. VAX-11/750 memory upgrade kits will be available in early 1983, the spokesman said.

DEC also announced a second Unibus for the VAX-11/750 that reportedly increases the system's configuration flexibility and I/O bandwidth. The DW750 add-on Unibus is identical to the system's integral Unibus and provides the same 1.5M byte/sec data rate, the vendor said.

It consists of an extended Unibus adapter module, a 15-ft Unibus cable and a terminator. The add-on Unibus requires an optional expander cabinet and expander box to house the Unibus backplanes.

The DW750 costs $5,000 and is slated for October delivery.



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CW42682

FCC: BOCs Should Be Allowed to Offer Gear

(Continued from Page 1)

The proposed divestiture of the Bell operating companies cannot be implemented until the commission decides it would be in the public interest, the FCC added.

The National Association of Regulatory Utility Commissioners (Naruc), representing state regulators, also strongly backed freeing Bell operating companies from the restrictions that AT&T and the Justice Department agreed to last January in the proposed settlement of the government's antitrust case against Bell [CW, Jan. 18].

Among other provisions, the agreement limits the operating companies, after divestiture, to the provision of local-exchange and exchange-access services.

"We do not perceive any reason for concluding that a properly regulated firm providing local-exchange telephone service is more likely to monopolize an unregulated business than any other firm that participates in more than one market," the commission said. Terminal competition "probably would be enhanced if one or more Bell operating companies entered that market after divestiture," the FCC contended.

The commission agreed that letting the operating companies offer electronic information services might give the local operating companies an advantage since competitors would have to use Bell operating companies-supplied local-exchange facilities. But "the commission has adopted rules in the Second Computer Inquiry [Decision] that will preclude such abuses."

According to the Computer and Communications Industry Association (CCIA), the settlement fails to "remedy the anticompetitive effects of the vertical integration of AT&T's Long Lines Division and its wholly owned subsidiary, Western Electric."

The only way to obtain an "inviolate and enduring framework for competition in the telecommunications industry," the CCIA added, is to divest AT&T's service groups — the Long Lines Division and the Bell operating companies — from one another and from Western Electric.

The Association of Data Processing Service Organizations, Inc. (Adapso) expanded on this theme. AT&T will have both the ability and the incentive to cross-subsidize its competitive offerings with revenues earned from monopoly services, Adapso said.

Adapso added that only 3% of intercity revenues now go to AT&T's competitors and this "can be expected to continue for the foreseeable future." Alluding to last year's hefty rate increases, Adapso said AT&T has "demonstrated over the course of the last 12 months [that] it possesses the power to raise substantially its intercity rates without losing more than a trickle of customers."

These inflated rates, by providing the means of subsidizing competitive services, will enable AT&T to "engage in the same sort of conduct" that led to the filing of the government's antitrust suit, Adapso argued.

Under the procedure proposed by the Justice Department and AT&T, there would be no judicial or public review of the reorganization plan once Greene has approved the proposed consent decree. The plan would be drafted by the phone company and reviewed by the Justice Department. If approved by that agency, it would go into effect automatically.

DEC Answers Network Call

(Continued from Page 4)

data, sending interrupt messages, receiving unsolicited messages, error control and status reporting, the spokesman explained. System-to-system connections can be made over both permanent virtual circuits and switched virtual circuits.

Version 3 of Decnet-VAX reportedly supports the DMP11 Unibus controller and the synchronous line of DMF32 communications controller; both recently debuted with the 11/730 computer.

The applications level of Decnet-VAX is already embedded in Version 3 of the VMS operating system to allow users with an eye toward future network linkups to develop Decnet-compatible applications programs. When desired, users can add the full Decnet-VAX that enables connection of multiple systems in a Decnet Phase III network, the spokesman said.

Finally, the DMP11 intelligent controller attaches to the Unibus of any VAX system and handles DEC's Digital Data Communications Message Protocol for high-speed synchronous direct-memory access communications across multipoint and point-to-point networks.

The controller transfers data at speeds of up to 1M bit/sec and offers hardware support for up to 32 tributary stations plus a control station, the spokesman said.

Both VAX-11 PSI and Decnet-VAX will be available in June through a software license. The VAX-11 PSI license costs $5,000, while the license for Decnet-VAX is $6,000. The DMP11 controller is available in four models to conform with local and remote interface standards and is priced at $6,900. Deliveries are slated for July.

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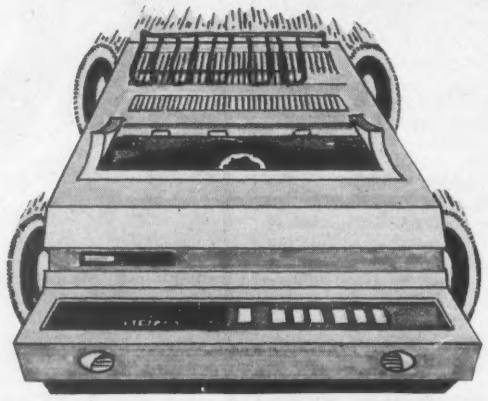

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You May Have to Modify Modems

BSC Users: Encountering Wats/MTS Delays?

By Bruce Hoard
CW Staff

Users of Bell 201, 202 and compatible half-duplex modems that transmit Binary Synchronous Communications (BSC) data via Wide-Area Telecommunications Service (Wats) or the Message Telecommunications Service (MTS) can apparently expect increasing propagation delay problems unless they adapt their equipment to receive satellite transmissions.

Bell operating companies decided late last year to move more Wats and MTS traffic over satellite links [CW, March 23, 1981]. IBM's BSC is one of the most widely used data communications protocols, but cannot handle the time delays caused by the nearly 50,000-mile round trip over satellite links.

According to Dennis Thovson, district manager, Network Services Planning at AT&T, the probability of encountering a Wats or MTS satellite link has gone up. Approximately 20,000 trunks out of a total of 445,000 are now routed over satellites, he said.

"We don't consider it a problem at this point, anyway," Thovson noted.

When satellite circuits were introduced in the mid-'70s, the combination of echo suppressors and delay caused some problems for users, he said. In order to combat the situation, Bell added echo cancelers "on just about all of the satellite links" and users were able to modify their data sets to beat delay problems.

Delay Exists

"The physical fact of long delay is there and there is not much to do about it," Thovson said.

George Grumbles, president of Universal Data Systems, Inc., a modem manufacturer whose product line includes Bell 201- and 202-compatible models, said the firm had solved earlier problems by inexpensively modifying its modems for satellite transmission.

Asked about the cost of these changes, he replied, "It's not really significant. It's the kind of thing you have to make up your mind about doing or not doing and if you decide to do it, you can do it reasonably inexpensively on a new product. It is very difficult to retrofit older modems for satellite transmission.

"It will not go away," Grumbles said of the delay.

One user who experienced difficulty with satellite propagation delay is Brad Lebo, senior telecommunications engineer with Pfizer, Inc.

The company's remote sites in Terra Haute, Ind., and Brooklyn, N.Y., were unable to communicate with each other because data calls from one were routed over terrestrial links and those from the other went via satellite, he explained.

Facing Problem

In order to alleviate the problem, company executives specified that modems "accommodate the delay." In addition, the company has leased telephone lines, a procedure Lebo said was expensive but made less so by running voice communications over the same lines.

John Malone, president of the Eastern Management Group, a telecommunications research firm, said Bell anticipated satellite-related problems but did not build a "fix" in.

"If users accidentally caught a satellite link, Bell was insensitive to the problem," Malone said.

The president portrayed the AT&T move to shift data traffic over satellites as part of a long-range plan that will ultimately return it to earth and terrestrial lines sometime during the next four or five years.

By 1986 or 1987, large users will gain access to "virtual private-line offerings" over land-based facilities, he claimed.

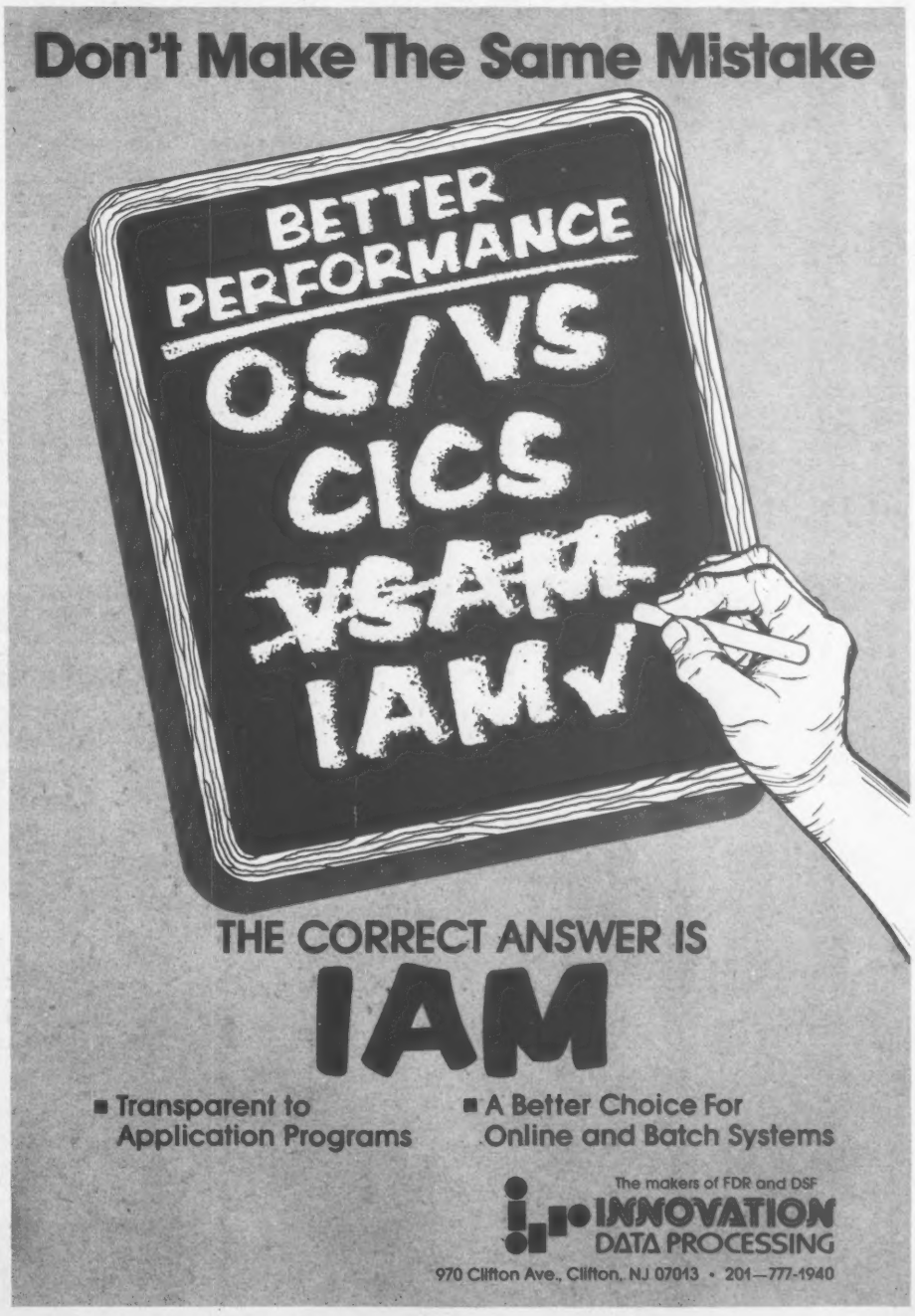
"The insidious thing about it is you have to clock down the entire system even though you're only going to get hit 10% of the time . . . The analysis we did said the costs are effectively doubled once you have to clock down the modems to those satellite rates.'

"The problem is, right now there is not a short-term fix for the problem, short of going to private lines," Malone declared.

George Pfister, president of the Perspective Telecommunications Group, called attention to the high cost of adapting existing installations with the affected modems for operation under satellite conditions.

"The insidious thing about it is you have to clock down the entire system even though you're only going to get hit 10% of the time," he observed. "The analysis we did said the costs are effectively doubled once you have to clock down the modems to those satellite rates."

As an alternative, Pfister suggested users change over to the High-Level Data Link Control protocol or its IBM subset, Synchronous Data Link Control.



NAS Replaces Two Lines With 4341-2 Rivals

(Continued from Page 1)

[the 4341 Model Group 2], but since it's a new product, conservatively, the only thing we will say right now is that it's equal to or better than the [IBM system] in all environments," the spokesman said.

Both members of the AS/6100 line will sell for roughly 80% of the price of their 4341 Model Group 2 equivalents, the source added.

As its model number suggests, the AS/6100 series provides a level of processing power that places it somewhere between NAS's existing AS/7000 and AS/5000 mainframe lines. In contrast to the AS/7000, which executes roughly three million instructions per second (Mips), the AS/6130 is rated at about 1.5 Mips and boasts a 75-nsec machine cycle.

The AS/6150, by contrast, executes 1.95 Mips, with a 60-nsec machine cycle, the spokesman said.

The AS/6100 series CPUs incorporate 64K-bit random-access memory (RAM) circuits and mark the first time NAS has used 1,200 gate/chip emitter-coupled logic arrays in its mid-range processors, a company spokesman said. Previously, NAS medium-scale machines achieved a logic density of only 500 gate/chip.

Together, the 64K-bit RAM and 1,200 gate/chip logic devices reportedly trim the processor family's floor-space requirements to 67.5 in. by 32.2 in. and boost its reliability threefold to fourfold over previous NAS mainframes.

In addition to being compatible with all 4341 Model Group 2 operating systems, applications software and program products, the AS/6100 series CPUs can run any code originally written for IBM 1400 and 7070 series processors, the spokesman said.

The NAS machines also support any peripherals currently operating with the 4341 Model Group 2 — even hardware modules that have a data streaming capability, the source added.

With the introduction of the AS/6100 series, the NAS product spectrum now spans four IBM-compatible processor families, which also include the AS/5000, AS/7000 and top-of-the-line AS/9000 — the latter an IBM 3081- and 3083-class offering.

For both the AS/6130 and AS/6150, the number of channels is said to be fixed at six. The two machines also require a minimum of 4M bytes of main memory, which can expand in 4M-byte increments to a maximum of 16M bytes.

An AS/6130-based system can be upgraded in the field to an AS/6150 by plugging additional printed circuit boards into the smaller processor's card cage, the spokesman said. Expanding from an AS/5000 to an AS/6130 or from an AS/6150 to an AS/7000, however, requires a new CPU, he said.

Support for the AS/6100 models can be obtained either through NAS's field-service offices or through the company's "problem-determination center."

Shipments of the AS/6130 and AS/6150 are expected to begin in the fourth quarter of this year and the first quarter of 1983, respectively, NAS said.

An AS/6130 with 4M bytes of main memory and six channels will sell for $325,000, compared to $390,000 for a similarly configured AS/6150. Each 4M-byte memory increment will cost an additional $50,000.

Both mainframes will also be available through two- to five-year leases from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94040.

Air Force to Strike Gold With Old CPUs

(Continued from Page 1)

100,000 vacuum tubes and occupying the entire ground floor of a four-story Sage complex here, according to an Air Force spokesman.

The processor was used until last October to coordinate information from U.S. radar surveillance sites and airborne surveillance planes into a single radar picture. The system was also used to compare detected aircraft with prefiled flight plans.

Five other Sage systems still in operation at Air Force bases in the U.S. and Canada are scheduled to be deactivated. An Air Force spokesman said that a specific timetable for this deactivation has not yet been specified.

"This is the pilot project and we expect it to be worthwhile," Berret said, adding that it is impossible to estimate how much precious metal is in the system because there are many variables.

For example, silver solder is used in the numerous wire connections in the system. But the amount of silver on each connection is difficult to quantify. In addition, gold-plated connectors are coated with varying thicknesses, depending on the intended use of that connector.

Berret said that IBM provided some information about how much precious metal the Air Force can expect to extract, "but even they weren't too sure."

"Before the precious metals people got there we took off in the neighborhood of 150,000 items and sent them to other divisions and to IBM as bench stock. Then the precious metals people came in to strip out all the connectors and wires. They said they would get 30 ounces of gold per ton of computer," Walter Bailey, a former technician on the system, stated.

"They used gold quite generously when they put that thing together. That's what the precious metals people told us. At $32 an ounce [the price of gold in the late 1950s] I can see where they could afford to use it in those days," Bailey noted.

Two engineers are in the second week of extracting the precious metals from the system. An Air Force spokesman said an additional four weeks may be required to complete the project.

The processors are now being replaced by specialized processors designed by Hughes Aircraft Corp. The six processor locations will be reduced to four sites, according to the Air Force.

The Sage processors were installed in the late 1950s; the Duluth system was installed in 1959. The Duluth base is being closed, a spokesman said.

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CIA Delivers Promised Report on Soviets

(Continued from Page 1)

reportedly a summary of classified information, describes a "massive, well-planned and well-managed" effort to obtain Western technological know-how and products. But, as Inman suggested to the committee, the report does not outline any current national security problems associated with open dissemination of nongovernment basic scientific research results.

The committee had expressed a fear that the U.S. intelligence community's well-founded concern about illegal diversion of American technology might lead to government attempts to restrict the publication of basic research. This fear was raised when Inman said in January that the magnitude of the diversion problem would lead to a backlash of public and congressional opinion against scientists and researchers [CW, Jan. 18].

Under pointed questioning from the House panel, however, Inman retreated from that stance and suggested that there is little problem now with scientific publications helping the Soviet military. But he maintained that will change as the U.S. becomes more successful in combating Soviet espionage and illegal diversion of commercial technology to the Eastern bloc [CW, April 5].

The report submitted to the committee last week underlined the present dimensions of the diversion problem, saying: "The [technology] acquisitions that most directly affect Soviet military development have come from intelligence collection and related illegal trade diversions." The "overwhelming majority [of that technology] . . . was obtained by Soviet intelligence services and their surrogates among the East European intelligence services," the CIA said.

However, the report did warn that "the Soviets have been stepping up their efforts to acquire new and emerging technologies such as very high-speed integrated circuit and very large-scale integration technologies from Western universities and commercial laboratories for both military and commercial applications."

The report described a well-orchestrated campaign of Soviet intelligence agencies to match East-West scientific and academic exchanges with diversions of controlled technology from legitimate trade channels and legal technology purchases of Eastern firms chartered in the U.S.

Those channels of technology acquisition are closely coordinated with the activities of thousands of "technology collection officers" of the Soviet intelligence organizations, the report said.

The report continued that computers, communications and semiconductor technologies are of major interest to those agencies, which seek data on all phases of materials handling, design, fabrication and use of electronics equipment.

With no supporting details, the report claimed that the Soviets have obtained "complete systems designs, concepts, hardware and software, including a wide variety of Western general-purpose computers and minicomputers, for military applications."

In addition, the report said, the Soviets, through numerous acquisitions, have obtained "complete industrial [microelectronic] processes and semiconductor manufacturing equipment capable of meeting all Soviet military requirements.

"Hundreds of pieces of Western microelectronic equipment worth hundreds of millions of dollars" have been obtained by the Soviet Union, the report said, allowing that country "to systematically build a modern microelectronics industry . . . The acquired equipment and know-how, if combined, could meet 100% of the Soviet high-quality microelectronics needs for military purposes and 50% of all their microelectronics needs."

The report also warned that even greater Soviet needs for computer hardware and software and semiconductors will lead to even more concerted efforts to obtain Western technology.

In particular, the CIA said, "prime Soviet collection efforts" in this decade will target large-scale scientific computers, such as Cray Research, Inc.'s Cray-1, and all types of IBM software for the Eastern bloc's large inventory of IBM-compatible machines.

Group Forms For IBM Users

PITTSBURGH — An IBM small systems users group has recently been formed covering the areas of western Pennsylvania, eastern Ohio and northern West Virginia to provide communications between users of similar IBM hardware and software.

Membership is open to any tri-state-area user of IBM Series/1, 5100, 5110, 5120, System/23 Datamaster, System/32, System/34 and System/38. Dinner meetings are held on the second Tuesday of every month.

Dues are $24/year for regular memberships; associate memberships are $36/year and student memberships are $12/year. Additional information is available from Warren Rodgers, Computer Specialists, Inc., Suite 800, Jonnet Building, Monroeville, Pa. 15146.

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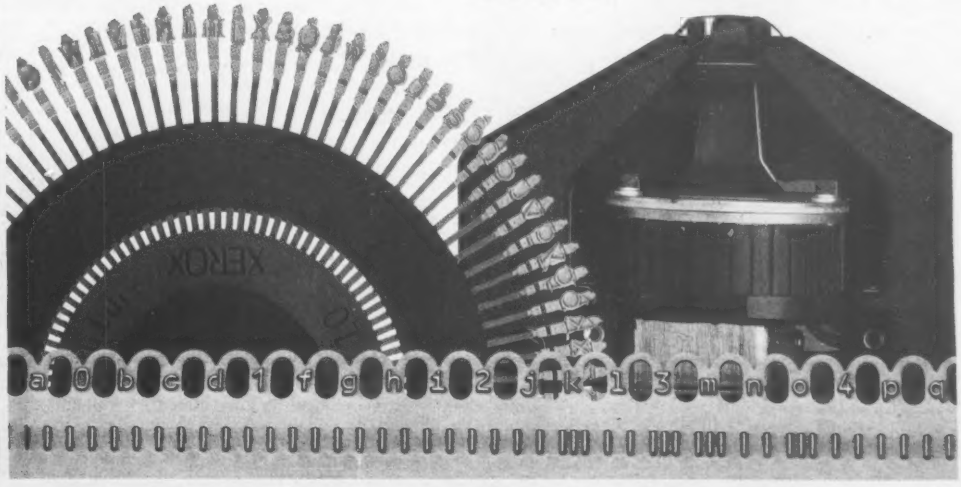

DP Crime to Snowball in '80s, Keynoter Warns

By Bob Johnson
CW New York Bureau

NEW YORK — The remainder of this decade will prove to be a dangerous period for the DP industry in terms of computer fraud and crime.

That was the message from Dr. Brandt R. Allen of the University of Virginia's School of Business Administration, who was the keynoter at the Twelfth Conference on Computer Audit, Control and Security here last week.

Allen said there are danger signals evident throughout the computer industry and that the problems of computer audit, control and security will be greatly magnified before the end of the '80s. Because technology is becoming more sophisticated and voluminous, he said, business will be faced with problems of securing data unlike any witnessed before.

He pointed out that communications between computer sites will continue to increase at such a rapid pace that the DPers involved in controlling sensitive data can expect to encounter serious obstacles.

The speaker also explained that the backlog of applications within the computer community is forcing users to seek out other computer solutions to their processing problems.

Users are now utilizing service bureaus, minicomputers and microcomputers and are also purchasing software packages. All of these factors are allowing data to escape audit security and controls, he noted.

Allen pointed to the proliferation of microcomputers in large user shops as one major problem in stemming the loss of data security.

Some companies put a substantial amount of work and money into creating large systems and internal controls to be used throughout a corporate network only to find that remote locations are using personal computers to perform the bulk of the work.

One example offered to illustrate his point involved an executive at a large bank that was hooked up online to the bank's corporate headquarters via a terminal located in his office. The executive also had a personal computer that he used for most of his work, giving various excuses for avoiding the remote terminal.

Thus, all of the internal controls installed within the main corporate CPU were effectively ignored by a company executive and a security breach became possible.

Company core applications programs will be another area sensitive to computer abuse, according to Allen. Many large firms' key applications programs will have to be rewritten in the near future, he maintained, calling this "the best-kept secret in the DP industry."

Application software, nearing its 15th birthday, is costly to maintain and probably needs to be changed, he said. "This will be a very dangerous undertaking because not only will the applications have to be rewritten, but more functions will be added."

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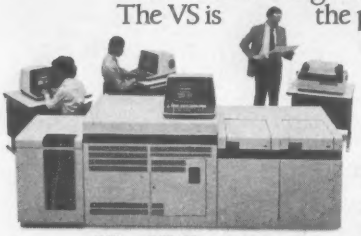

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Codd Eyes Fate Of 'Relational'

(Continued from Page 1)

cent IBM customer feedback that suggests his creation can improve a user's computing productivity "tremendously." One user, for example, credited its relational system with boosting the company's DP productivity twentyfold, he said.

But thus far, Codd cautioned, use of relational data base systems has been restricted almost entirely to equipment at the low end of the computing product spectrum. At the very high end, relational systems have yet to establish a firm hold.

So in the absence of any concrete user case histories, Codd stopped short of predicting that relational data base products will do for large-scale mainframes what they have already reportedly done for smaller configurations. "I have to be conservative in my forecasts" about how relational systems will affect the performance of high-end processors.

Economic Reasons

The reason relational models have yet to find their way into large-scale computing installations has to do with economics. Because of their heavy investment in existing data base management software, most high-end mainframe users have been extremely reluctant to convert from a system built around, for instance, a hierarchical model to a system that uses relational principles.

"It's a very difficult proposition to translate application programs from one data base management system to another and ensure any kind of performance and freedom from errors," he said.

The admitted "conservatism" in Codd's technology forecasts also extended to his comments about back-end processors. "They look promising," he said, "but right now it's a little too early to say anything definitive about the machines."

Like relational systems, data base processors of the sort manufactured by Britton-Lee will lend themselves primarily to small-scale computing environments, Codd predicted.

But how successfully back-end machines will compete with data base systems that reside entirely in software remains to be seen, he added.

Capacity Planning Said Critical to DP Site

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Capacity planning qualifies as one of the most "critical" factors in the successful management of corporate information technology, according to Edward Prichard, a senior consultant with the Institute for Software Engineering (ISE).

Once equated primarily with the management of internal machine cycles, capacity planning has steadily expanded in scope and is now often applied to an organization's entire DP configuration, Prichard said last week during a conference keynote address.

Speaking at the ISE's Fourth Annual International Conference on Computer Capacity Management, Prichard urged information systems directors to pay increased attention to their field's key technological interests, sometimes known as "critical success factors."

"Now is a very ticklish time to be in the [management information systems] MIS business," he told his listeners. "Top management's demand for [computing] support exceeds the organizational supply — a fact that has created a tremendous problem."

Identify Operations

To ease the resulting demand/supply imbalance, information systems managers need to identify the facets of their operations "where everything must go right" and then make those areas the subject of special consideration, Prichard said.

The rationale behind the ISE consultant's recommendation is simple: Information technology has advanced so rapidly and has become so diversified that it has completely overwhelmed most nontechnical executives. So rather than try to master the computing field as a whole, top corporate management is becoming increasingly selective in its DP focus and is consciously restricting its agenda of technological concerns and issues to a crucial few.

Some of these high-priority systems concerns, which Prichard refers to as "critical success factors," include key computing processes like applications management, organizational management and capacity planning.

Another critical success factor for corporate computing departments is the available supply of young, talented programmers and other DP professionals, who are becoming increasingly scarce. In fact, of all the DP discipline's critical success factors, the growing shortage of skilled technical specialists may well rank as the most pressing, Prichard said.

Turning his attention to a related subject, Prichard noted a growing acceptance and awareness of information technology among top general management and characterized the phenomenon as one of the computing field's "major hot buttons for the 1980s." Just as the industry has already given rise to computer-aided design and manufacturing, so it will also lead soon to the emergence of the "computer-assisted executive," the ISE consultant said.

Orsa, ITMS Meet To Examine Support Systems

PHILADELPHIA — A one-day seminar on decision support systems will be held here this coming Friday by the Philadelphia Joint Chapter of the Operations Research Society of America (Orsa) and The Institute of Management Sciences (ITMS). The seminar will take place in the Bell of Pennsylvania building.

Keynote speakers include Dr. David Ness and Dr. Jerry Hurst of the Decision Sciences Department at the University of Pennsylvania's Wharton School.

Cost to attend the seminar is $55 for Philadelphia chapter members, $65 for nonmembers. More information is available from Bruce Johnson, 426 Vance Hall/CS, 37th & Spruce St., Philadelphia, Pa. 19104.

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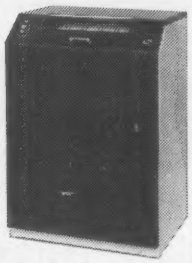

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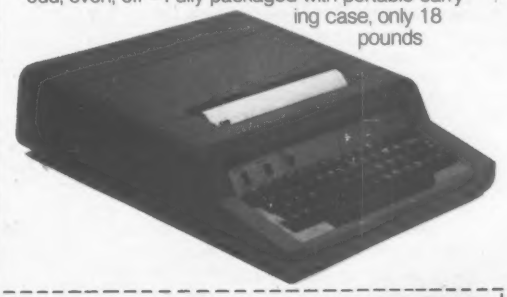

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Lobbyist Blasts State CRT Health Legislation

By Susan Blakeney
CW Staff

BOSTON — Heading the list of opponents to Massachusetts H-2910, which is designed to legislate standards for CRTs in offices, was William McCarthy, legislative agent for Associated Industries of Massachusetts.

Testifying at an April 20 hearing here, McCarthy came on strong for the opponents of the bill: "Video display terminals do not present any unique health risk that would justify state regulation in any way." Furthermore, he argued that not one piece of evidence exists that proves CRTs are dangerous to their users.

"There is no jurisdiction in any state that imposes any restriction at all" on the use of CRTs, McCarthy continued, and neither should there be in Massachusetts, he maintained. Only the state of Maine had proposed such legislation, and it was defeated.

"Job safety, job comfort, job satisfaction cannot be legislated as this bill attempts to do," McCarthy said. "Ergonomic issues must operate in an area of flexibility — state law should not be used."

McCarthy concluded his argument with an appeal to the committee: "Are you even going to contemplate a bill for which no case has been made?"

Niosh Study Challenged

Dr. Frank Kefferstan, medical director for John Hancock Mutual Life Insurance Co., followed McCarthy's lead: "Not one of our employees has raised these complaints."

Kefferstan challenged the results of the 1981 National Institute for Occupational Safety and Health (Niosh) study, which tested a large number of CRT terminal operators in the San Francisco Bay area [CW, Feb. 16] (see story on Page 13), calling it biased, subjective and outside the realm of credible research that has resulted in needless anxiety in the CRT work force.

The alleged symptoms reported by the Niosh study "could be associated with any other number of jobs," Kefferstan continued. He also claimed there is a high number of health complaints in companies where there are labor/management problems and few in those companies without such problems.

He wound up his argument with this summary in regard to CRTs:

- There is no radiation given off by these machines and no documented evidence of eye disease or damage.
- Common sense adjustments should be made by individual companies.
- Flexibility is the watchword and these guidelines should not be made into law because law is too rigid.

When asked how he felt the hearing went, Joseph Faherty — vice-president of the Massachusetts American Federation of Labor and Congress of Industrial Organizations Union, president of the Boston Edison Clerical Workers Union and one of the chief authors of H-2910 — commented that "there will soon be cases coming down the road" to disprove Kefferstan's claims.

"I'm not discouraged," Faherty concluded, citing patience as his mainstay.

CW Photo by S. Blakeney

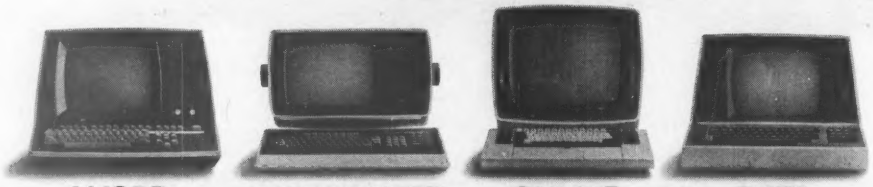
Dr. Frank Kefferstan, medical director for John Hancock Mutual Life Insurance Co., called the Niosh study biased and subjective.

Ansi Standards Now Available for Checks

NEW YORK — Copies of the Ansi standards for the bank check background and convenience amount field are now available.

According to an Ansi spokesman, the publication, "Ansi X9.7-1981," establishes requirements for the format of the payment document, background and printed data, transit routing number, printed borders and preprinted information.

Copies of Ansi X9.7-1981 cost $6.95 from Ansi's sales department, 1420 Broadway, New York, N.Y. 10018.



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Joseph C. Faherty, a chief author of H-2910, cited a recent Niosh study that found CRTs cause a large percentage of eye problems.

Bay Staters Square Off on Bill to Legislate Health Standards for Offices With CRTs

By Susan Blakeney
CW Staff

BOSTON — Proponents and opponents of a bill that would legislate health standards for offices employing CRTs last week had their day in court here.

Massachusetts H-2910 proposes a long list of would-be employer requirements, including the written forewarning of implementation of CRTs in a work place, periodic and extensive eye examinations and compensation for any corrective lenses required by a worker due to CRT use, several lighting requirements and 15-minute work breaks every two hours away from the CRT screen.

In a series of eight brief testimonies at the April 20 hearing, five people spoke in favor of the proposed bill and three argued against it (see story on Page 12).

Timothy Bassett, chairman of the Massachusetts Commerce and Labor Committee, presided over the hearing.

Joseph C. Faherty, who is vice-president of the Massachusetts American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) Union, president of the Boston Edison Co. Clerical Workers Union and one of the chief authors of H-2910, led the campaign to pass the bill.

He cited the 1981 National Institute for Occupational Safety and Health (Niosh) study that tested a large number of CRT operators in the San Francisco Bay Area [CW, Feb. 16], which found that "93% reported eye strain and 78% reported blurred vision" since using CRTs.

Diane Barry, chairman of the Health and Safety Committee of 9 to 5, a Boston-based organization for women office workers, stated: "Workers desperately need the protection that this bill would provide."

Adequate Protection Needed

Maintaining that the bill was "vitally important in order to increase job satisfaction and reduce stress in the work place," Barry said that 89% of CRT operators are not protected by union contracts and only the passage of such a law could provide them the protection they need.

In addition, she stated that large numbers of CRT operators wanted to testify at the hearing in favor of the legislation but were unable to get the time off from work.

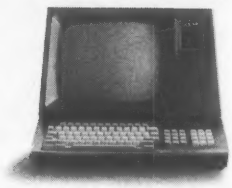
"We couldn't show the real victims," she remarked.

They were therefore encouraged to write letters including their testimonies to the committee.

Other testimonies in favor of H-2910 included those of Larry Sullivan, secretary treasurer of the Greater Boston Chapter of the AFL-CIO, and Claude Cozzulino of the Massachusetts Coalition of Occupational Safety and Health Administration.

"We must make people more conscious of the office as a work space . . . most people think of mining as a hazardous occupation," but never the office, Sullivan maintained.

"What's good for the traditional office is not necessarily good for the office with CRT or automated equipment," Cozzulino said, closing the argument for the proponents.



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'Spectrum' Set June 29-July 1

CHICAGO — Spectrum of Solutions '82, a traveling exhibition and conference on computer applications software, is slated to take place here June 29-July 1.

The event is being sponsored by Prime Computer, Inc. and more than 25 software firms.

Aimed at managers interested in business, engineering and manufacturing applications, the show will present a range of products, techniques and services in a series of workshops, demonstrations and exhibits.

Software for financial planning and electronic mail, as well as computer-aided design packages and manufacturing resource planning tools will be showcased.

Spectrum of Solutions opened in Anaheim, Calif., in February and will visit New York and Dallas in the fall.

Advance registration is free; admission at the door is $5.

Further details are available from Prime Computer, Spectrum of Solutions, MS 15-60, Natick, Mass. 07160.

Performance Improvement Neglected

GAO Urges Federal DPers to Optimize Cobol

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Noting that the federal government spends about $15 billion on data processing and that most federal installations are primarily Cobol shops, a recent report from the General Accounting Office (GAO) found that many government agencies have done little to optimize Cobol performance to reduce machine consumption.

Addressing this large federal inventory of Cobol application programs, the GAO said that of the many operational phases of applications — development, maintenance, modification, performance improvement and conversion — performance improvement is too often the neglected child at most government DP shops.

The study placed much of the blame for this neglect on the inexperience of the average Cobol programmer — inside government and in the private sector — who the GAO described as having only limited knowledge of the many tools available for developing better programs.

The GAO said that it undertook its study because of the "commonly reported phenomenon that a few programs consume a disproportionately large amount of total machine resources." GAO auditors visited several federal installations, reviewed the available literature on program optimization and performed tests on a commercially available optimizer.

From its visits, the GAO found many federal installations could realize "significant benefits" through optimization, particularly in recovering machine resources, thereby deferring the need for additional hardware capacity.

For example, the GAO said that the Department of Housing and Urban Development, through a concerted effort at optimizing programs in five systems, recovered CPU time equivalent to $83,400 during the first year alone. Based on a figure of $350 per CPU hour, four-year savings were projected at $390,600. Also, CPU time in one of the systems was reduced 82%, the GAO found.

And at the Defense Mapping Agency, the GAO helped to optimize a standard print routine used in many of the agency's Cobol applications. The cost savings of $1,357 for that one routine can be extended to about 100 agency programs, the GAO said.

Two More Benefits

Besides the possible recovery of CPU time, the GAO noted two other benefits of tuning Cobol applications: reducing operational problems and improving software quality.

The study remarked that in general, "efforts to improve existing applications must select applications that are expensive or that are operational problems — so that the work will be worth doing."

Despite these obvious benefits, the GAO found some federal installations "have done little or nothing" to examine the amount of machine resources wasted by inefficient Cobol programs. The study suggested several possible reasons for this, including:

- The cost of machine resources is not the chief concern of users, many of whom are confronted with large backlogs and labor shortages.
- Programmers do not perceive pressure from management and are not self-motivated about the cost of operating their programs.
- Many Cobol programmers are not familiar with advanced features or usage techniques for the Cobol language.

"The head of the [General Services Administration's] compiler testing center said he felt that most Cobol programmers are familiar with, at best, one-fourth of the features of the language and know little about how to use the language effectively and efficiently," the GAO said.

The study recommended a systematic approach to Cobol optimization, an approach that first identifies programs that consume large amounts of CPU time and that have identifiable benefits from optimization. Work on these likely candidates must be closely monitored to insure that the desired economies are being produced with no disruption of their application, the study added.

The GAO report contains a checklist for identifying programs for optimization efforts and for initiating and managing specific optimization procedures. The report also briefly discussed various automated tools, such as analysis aids and automatic optimizers.

The GAO also noted that many of the same techniques used to reduce machine use of applications after they have been running can be used when applications are first developed.

The report, "Improving Cobol Applications Can Recover Significant Computer Resources," No. AFMD-82-4, is available free from the U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, Md. 20760.

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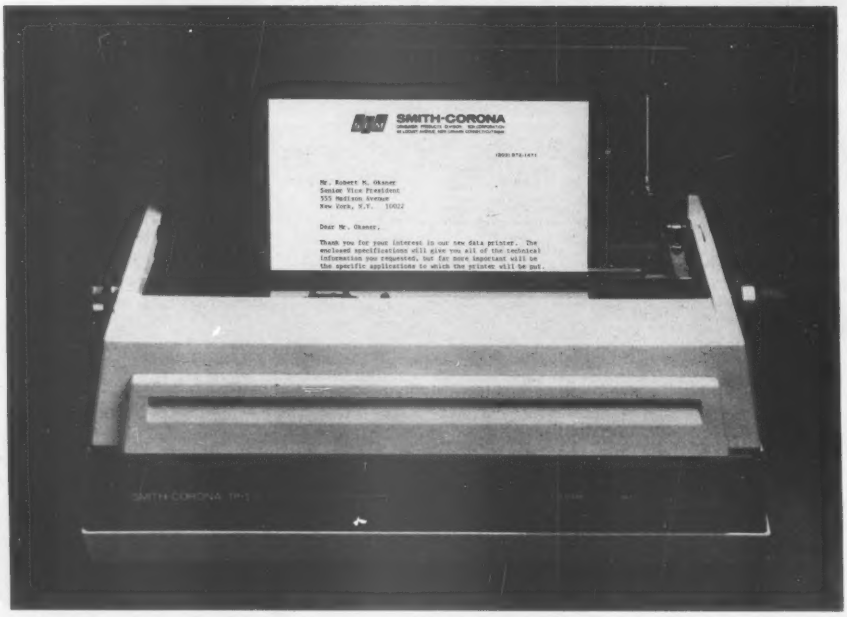

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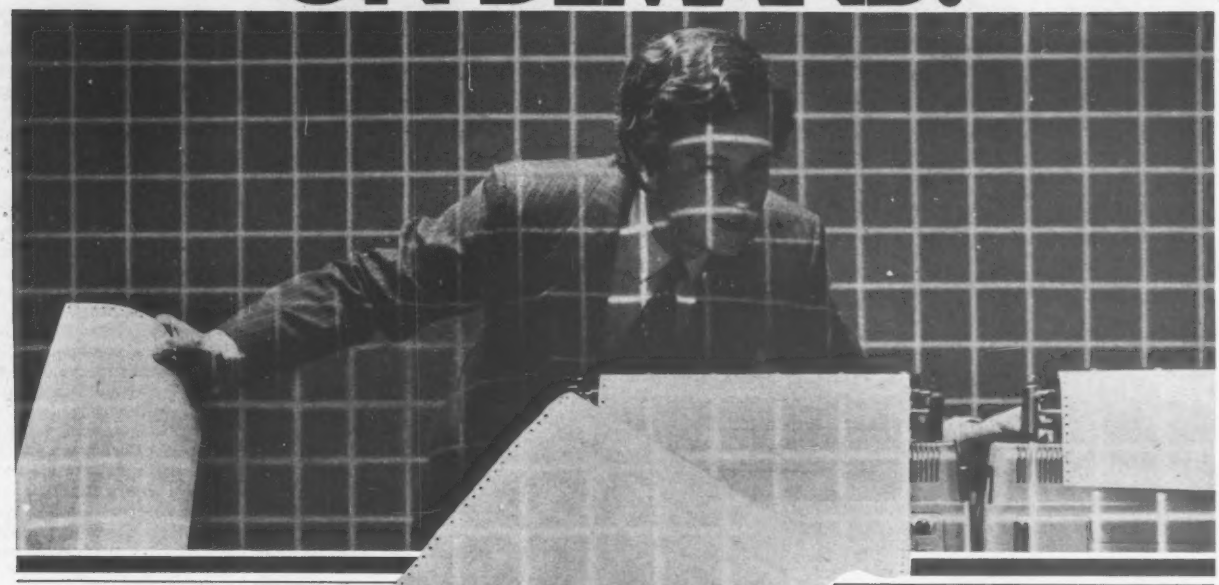

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Comments Sought on DES

WASHINGTON, D.C. — The National Bureau of Standards is seeking comments in its review of the Data Encryption Standard (DES) issued five years ago.

The DES, a Federal Information Processing Standard, is also used by private-sector organizations. The National Bureau of Standards is reviewing "technological trends and other factors to determine whether the standard should be affirmed, revised or withdrawn."

The bureau is seeking comments on the implementation and use of DES and will also entertain specific recommendations for improving the standard.

Comments should be submitted before June 21 to Director, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234.

West Coast Power Officials Still in Dark About March Outage

By Susan Blakeney
CW Staff

THE DALLES, Ore. — The lights went out up and down the Pacific Coast late last month because of a computer malfunction at the Bonneville Power Administration (BPA) headquarters here, but officials still do not know why the computer went down.

Technicians performing routine systems maintenance on the main computer at the BPA headquarters apparently caused a system's crash that triggered the power outage on Saturday, March 27, at about 10:30 a.m. Pacific time, affecting energy consumers in seven western states and northwestern Canada. Bill Murlin, a spokesman for the BPA, said "We're still not sure why it tripped out."

Murlin said the technicians thought that the main computer system, which is based on a General Electric Co. 4020, was disconnected when they were conducting their tests and that the system was operating on the backup computer. Apparently, this was not the case and the system went down, Murlin explained.

"We'd have to do it again to find out why — and we don't want to do that," Murlin said.

The loss of power was noticed immediately at the computer center and the backup computer was soon carrying the load, but not before the voltage distribution levels went haywire.

For example, one of the lines of direct-current voltage to Southern California went down and the power was transferred onto the line through San Francisco, which soon overloaded and also tripped out.

According to Donald Baxter, manager of public information at Pacific Gas & Electric Co., the amount of "downtime varied throughout the western system and up into Canada. Some portions of the [San Francisco] Bay Area were out for 2½ hours.

"When we were able to match the load, we picked it up [the power supply] with our own power plants," Baxter continued.

Dennis Eyre, administrative manager of the Western System Coordinating Council — a body that oversees the power supply in this region — said about 1 million customers were affected in the Salt Lake City area. Most had their power restored in 10 to 15 minutes; a small minority was out for as much as three hours.

Utah Backup Source

As in California, the Utah system automatically switched its power load over to a backup source to restore the system's equilibrium and no permanent damage was sustained.

Eyre said that "a number of factors entered into it [the outage], but the initiating cause was the maintenance people."

Because of the "protection schemes built into the system that sense when it's getting into trouble," Eyre continued, "we were able to isolate the problem area so the outages didn't spread.

"The system automatically shed some customers to prevent shedding all the customers."

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'Congress . . . Has Failed Us'

No Deregulation Bill, NTIA Ex-Chief Predicts

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Congressional efforts to write telecommunications legislation are a lost cause, according to the Carter administration's chief information and communications official, who predicted recently that no bill will be passed.

Surveying six years of Capitol Hill turmoil over deregulating AT&T, Henry Geller said at the conference of the Associated Information Managers here on April 16 that "Congress once more has failed us." Pointing to growing congressional opposition to pending telecommunications bills, Geller said "I don't think there will be any legislation at all."

Geller, the former head of the National Telecommunications and Information Administration, suggested that the continuing efforts of House telecommunications subcommittee Chairman Rep. Tim Wirth (D-Colo.) are aimed solely at influencing the settlement of the Justice Department's antitrust suit against AT&T.

"I think he's sending a message to [presiding Judge Harold] Greene," Geller said of Wirth. Geller, now director of Duke University's Center for Public Policy Research, decried what he sees as a typical U.S. solution to complex policy issues: leave them to the courts for final resolution.

Unfortunately, he continued, "The judge is not going to remake telecommunications policy in an antitrust suit [settlement]."

'Sound' Settlement

Geller said that the Justice Department and the Federal Communications Commission (FCC) have done a credible job in trying to restructure the U.S. telecommunications industry. He called the proposed AT&T suit settlement "sound in general terms."

But, he added, the Justice Department's approach to legislation has some significant problems. In particular, Geller said, the department's conclusion that interstate services are sufficiently competitive to be deregulated "does not hold up . . . You couldn't deregulate now; it would be horrendous."

He also criticized the settlement proposal's provision to bar the Bell operating companies, which would be divested, from offering enhanced DP/communications services. "This is "much too harsh," he said.

If the newly reorganized AT&T can offer such services through separate subsidiaries, there is no reason why the local telephone companies should not have the same option, Geller said. He further suggested that the state regulatory commissions may feel the same way, which, he said, will only lead to the same kinds of regulatory problems the FCC has had in regulating AT&T.

"I hope this is corrected by Judge Greene," he said. "If not, you will only find creeping [state] regulation coming in . . . Justice thought it had drawn a bright clean line [between regulation and competition], but I think it will find it has just exchanged one form of regulation for another."

In general, Geller endorsed the move to open competition in the telecommunications market and away from regulation. Speaking of full competition, he said "In 10 years, we will be there . . . In the meantime, it will be very difficult."

Noting that reliance on free market forces "is a proper system," Geller conceded that this process will undoubtedly mean higher local telephone rates. This "will be very painful," he said, adding there is nothing unfair about making customers pay for local phone services on a usage basis as they do for long-distance services. "I don't think it's the end of the world," he said of that arrangement.

In fact, he said, he would go even further in opening up competition in future telecommunications markets. He criticized congressional proposals to bar the unregulated Bell subsidiary from producing the message content of electronic publishing services.

Once the monopoly problems associated with AT&T's domination of long-distance services are resolved, there is no reason the Bell subsidiary should be excluded from any competitive information service, Geller said.

In the future, he said, "the critical [transmission] line will be the line into the home." Since the settlement will take that portion of communications out of AT&T's control, the company should have the same freedom in home services as any other firm, Geller said.

To keep Bell out of these markets, as the newspaper industry advocates, would be "protectionism — pure and simple," he said.

Geller concluded that the transition to a competitive telecommunications industry will be painful. Such a system "has its deficiences, but I think on balance we will be well served by it," he said.

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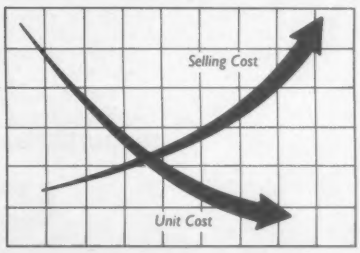

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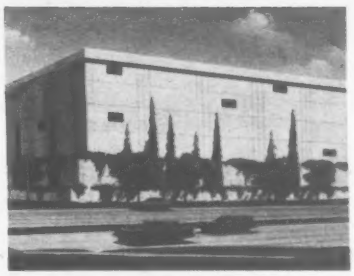

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'Own Ranks' Knock Human Resource Execs

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — Human resource managers in high-technology industries came in for some tough criticism from their own ranks at the recent Human Resources Conference held here.

Emphasizing the importance of human resources management in coping with technological change, several conference speakers pointed to the inadequacies in current human resources management techniques.

More concrete use of measuring results, a greater understanding of worker attitudes in the information age and an enhanced appreciation of organizational dynamics were among the issues discussed.

"Human resource management needs to find out what technological change means," James Ranier, president of Control Systems at Honeywell, Inc., told the conference.

'Gaping Inadequacies'

Ranier claimed management is currently doing its work with gaping inadequacies. He argued the case for training technologists in some of the "soft sciences," such as psychology, business management, economics and marketing. Problems cannot be solved by withdrawing from the arena, he said, yet few universities recognized the need for group skills, communication and the software skills of technology.

"The human side of management is the number one aspect for development of technological management. This implies a participative management process. American industry needs to bring about a complete turnaround in the way we manage organizations," he added.

Ranier asserted that effective utilization of technologists is a key factor in increasing productivity. The traditional carrot and stick policy will no longer work in management, he said. Instead there must be an emphasis on providing employees with self-esteem, which is, he claimed, a strong motivator and has a direct correlation with productivity.

"Answers to the human questions play a big part in the success of a business and organizational objectives are only attainable as long as they are consistent with individual objectives," he said.

Speaking on "Hi-Tech Industries: The Human Resources Management Issues," Gerald Pieters, vice-president of management organization at Signetics Corp., said the key question is how to use advanced technology "in a way that accelerates and makes simpler the processing of information so that managers are freed up to devote time to a proactive planning approach to coping with change."

Focus on Science

Several speakers focused on the need for more scientific human resource management. Jac Fitz-Ens, vice-president of industrial relations at Four-Phase Systems Corp., maintained that "there is not enough systems work and analysis of the implications of technological change. People want quick-fix solutions, which doesn't work.

"We need to get in and analyze the company culture, the worker's culture and what we are trying to achieve and build our programs on that basis," he said.

All too often, said Fitz-Ens, human resource managers build systems from their point of view. Instead, he argued, they should focus on what technologists in the companies need before going out and building something that may be useless.

Fitz-Ens recommended the establishment of short-term development plans focusing on training skills that have immediate payoffs, and the development of alternative incentive plans catering to the differing values of technologies within firms.

Firms should develop dual career paths and create a level of incentive and compensation for technical people — possibly up to a vice-presidential level — without requiring them to become managers, said Fitz-Ens, adding, "Why should we have to turn perfectly good technicians into bad managers?"

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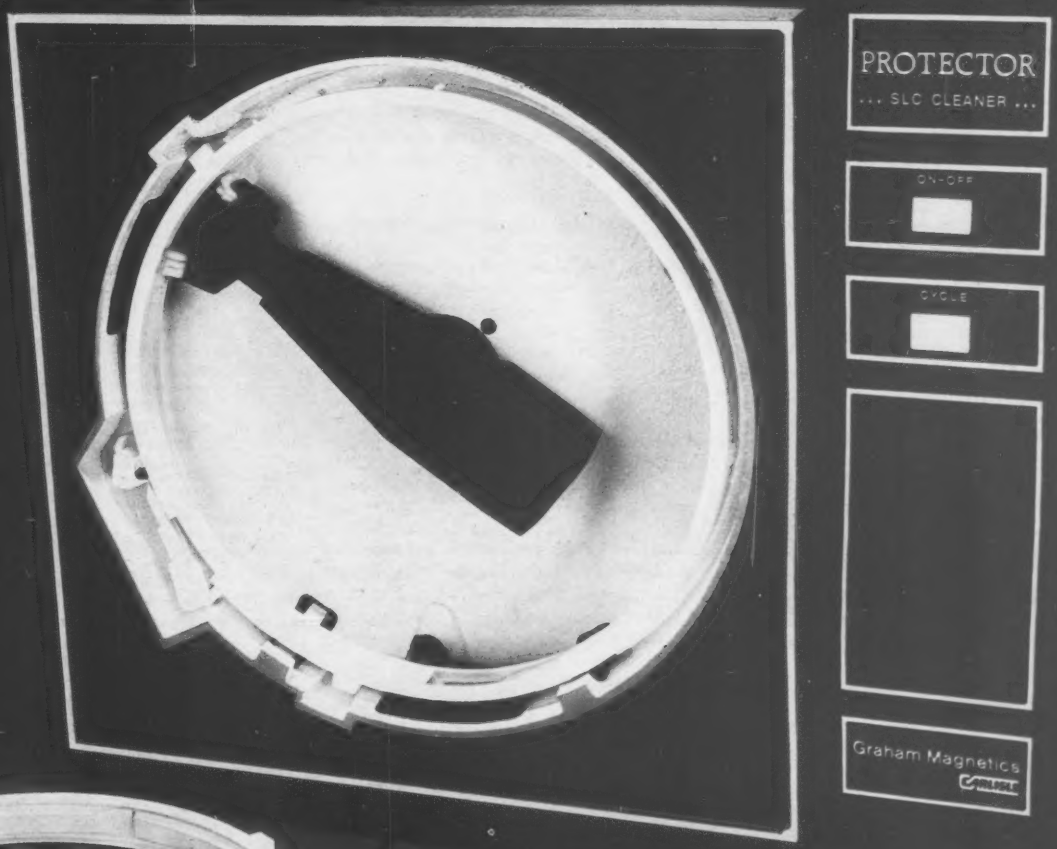

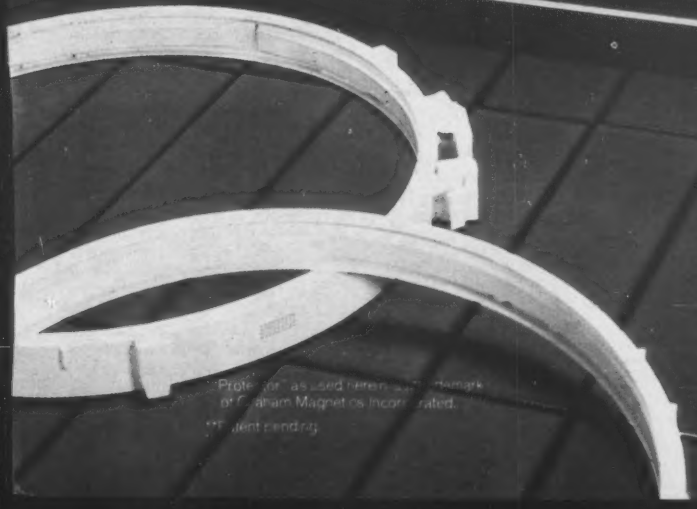

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Hinders Growth of Industry

Branscomb: Faculty Shortage Hurts Productivity

By Bob Johnson
CW New York Bureau

NEW YORK — Shortages of skilled faculty in computer science and engineering can hinder U.S. productivity levels and limit the growth of an industry that creates more than 50,000 jobs a year.

So said IBM Vice-President and Chief Scientist Lewis M. Branscomb at a recent talk sponsored by that company here on the conditions of science and engineering education in the U.S.

The meeting's discussions centered around the problems universities are facing in finding and training engineers and computer scientists. According to IBM officials, professors and students alike are hampered by obsolete instructional and research equipment.

Drastic Declines

In addition, although student enrollment in engineering and computer science at the undergraduate level has increased in the last decade, the number of students who go into doctorate programs and who are also the most likely to become professors, has "declined drastically."

"Our engineering skills determine not only our ability to translate scientific discoveries into commercial innovations but — to a major degree — the productivity level of the U.S. manufacturing industry," Branscomb said. "There is growing evidence that our engineering education is not up to America's needs in the eighties."

Branscomb gave as an example the fact that 100% of the high school students in Japan and the Soviet Union take four years of math courses, while only 6% of U.S. students take even one math course after the tenth grade. "A third of U.S. high schools don't offer enough math to permit a graduate to meet minimum requirements for entering engineering college," he explained.

Expressing academia's views on the problem was Frank H.T. Rhodes, president of Cornell University. Rhodes said the salary differences between what professors in computer science and engineering earn and what private industry pays for comparable skills is a major hindrance in attracting qualified instructors.

Faculty 'Shrinking'

He noted that Cornell's computer science department has had two faculty positions vacant for two years and that no qualified applicants are in sight. "Faculty in computer science and engineering is shrinking and aging. There has been a 24% reduction in scientific doctoral work," he stated.

Rhodes noted that the solution to these problems lies in the combined efforts of industry, government and the universities. He said that faculty salaries have to become more attractive and industry must offer would-be professors consulting work and adjunct professor positions. "Considering that 60% of all basic scientific research is done at universities, industry must offer research support in the form of financial help and equipment."

Industrial help is coming, according to the university president. He noted that Cornell received $15 million in gifts and support from industry last year with IBM being the single largest contributor, giving $800,000. Rhodes praised IBM's efforts, and said, "We face the danger of losing a generation of research development. IBM's contribution is a new model of partnership. It has taken a bold and farsighted lead."

Branscomb said that in addition to financial grants, companies can share in-house technical problems and talents with universities in collaborative research and can make special equipment and instruments available as gifts or loans. "The new tax law contains an interesting provision to encourage donations of research equipment by industry to universities."

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Ambitious manned missions in space will become possible with development by NASA of advanced solar-power platforms capable of electric-power output as high as 100 kilowatts or more. Hughes, under contract to the NASA Lewis Research Center, is building a breadboard 25-kilowatt dc-to-dc power converter that uses a transistorized series-resonant inverter. This module provides the basic building block required to match solar-array characteristics to payload requirements. The 25-kilowatt converter will utilize technology demonstrated earlier by Hughes in development of a lightweight 10-kilowatt converter that operated at over 91 percent electrical efficiency.

Costs of complex hybrids in military electronics have been cut up to 30 percent by an innovative laboratory serving as a "halfway house" between engineering and manufacturing. The Hughes Producibility Lab makes producibility verification models using manufacturing equipment and processes. In this way it thwarts production problems by ensuring that hybrids are designed to meet assembly-line capabilities. Reliability also improves. Manufacturing engineers work with design engineers to eliminate parts, adapt automated processes, develop automatic testing, and redesign substrates to minimize the number of wire bonds between integrated circuits and discrete components. The lab has demonstrated its worth by ensuring the production rate of the F/A-18 strike fighter radar.

A new version of the 1802 CMOS microprocessor offers faster speed, increased output drive, and other improvements. The new CPU chip, designated the Hughes HCMP 1802A, is a pin-for-pin and functional replacement for the 1802. It operates with a guaranteed minimum frequency of 3.2 MHz versus the 1802's guaranteed minimum frequency of 2.5 MHz at 5 volts. Selected parts of the new device can achieve 5 MHz operation. An internal Schmitt trigger has been added at the RESET input for simple R-C interfacing that can provide a power-on reset.

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Managers on the Move

JUDITH MANNELLA has been appointed vice-president of information services for LeMans Group, Ltd.'s national headquarters in Lancaster, Pa.

LeMans Group provides computerized vehicle leasing systems and management services for banks and other financial institutions. In this capacity, Mannella heads all software, hardware and support systems development for the company.

Prior to joining LeMans Group, she was a project manager with Keane, Inc. and also served on the management consulting staff for the accounting firm of Coopers and Lybrand.

Mannella graduated from the University of Minnesota with a liberal arts degree.

•••

TERRANCE J. SMITH was promoted to vice-president of data processing operations for the Southern Region Operations Center of American Express Co. in Fort Lauderdale, Fla.

He is responsible for all data processing and data services operations in the Southern U.S. Region.

Prior to his recent promotion, Smith was director of data processing operations for the center and previously was vice-president of technical services at the American Express Plaza in New York. He is a former director of corporate information systems for Schering-Plough, Inc.

Smith received a B.S in computer science from New York University and an MBA from Farleigh Dickenson College. He is director of the local Chamber of Commerce in West Broward, Fla., and serves on the Governor's Joint Select Committee on DP for the State of Florida.

•••

SUE B. YANG has been named a vice-president of Crocker Bank's Operations Division in San Francisco.

She manages the San Francisco Software Technical Services Department and is responsible for systems software in Crocker's Northern and Southern California operations centers.

Before joining the Operations Division in 1980 as a technical services project manager, Yang spent 14 years at Wells Fargo Bank working as a bank card collections manager and systems programming manager.

•••

RONALD TUCKER has joined Fremont Indemnity Co., a wholly owned subsidiary of the Fremont General Corp. in Los Angeles.

As vice-president of information systems, he assumes responsibility for the direction and control of all systems activities.

Prior to joining Fremont, Tucker was manager of corporate information systems for City Investing Co. Prior to that he served as general manager of information systems at Lockheed Aircraft Service Co. and was manager of financial information systems for Blue Cross of Southern California.

He holds a B.A. degree from California State University at Los Angeles and an MBA from the University of Southern California. He is a member of the Association for Computing Machinery.

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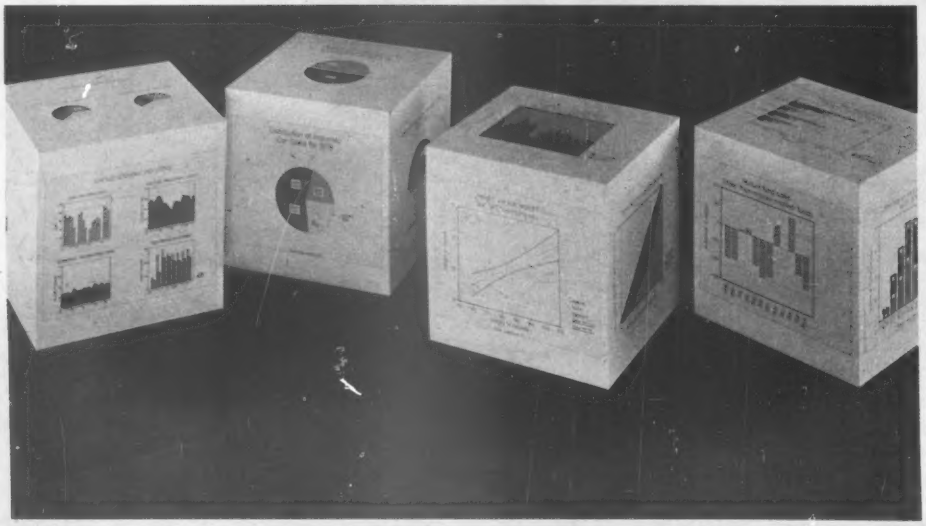

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Information Centers Said Answer to End-User Woes

By Brad Schultz
CW New York Bureau

CHICAGO — DP professionals spend so much time solving each other's problems that job requests from end users are commonly neglected. But information centers can ease this situation, speakers told a session of Deltak, Inc.'s recent Access '82 conference.

Country Mutual Insurance Co.'s Sonya Mau and Blue Cross of Northeast Ohio's Gary Livingston explained how they helped set up information centers in their respective organizations. Both said that the main benefits of consolidating information management into a resource separate from computational resources include reduced overhead costs and quicker delivery of answers to end-user problems.

What many DPers do all day is work on systems that enhance development, operation or maintenance of other systems, according to Mau, a former data resources manager who recently joined her company's systems and programming staff. In many companies, she declared, transaction processing largely consists of such work.

Demand Processing

However, "demand processing" — computer applications intended to fill ad hoc job requests from end users — fiercely rivals transaction processing for the attention of many DP professionals nowadays. Transaction processing may take more time than demand processing, but job orders for demand processing typically outnumber orders for transaction processing, Mau asserted.

DPers may be given less than a week to fill end-user job requests, but they commonly have nine months to two years in which to fill requests from other DPers, Mau maintained.

By boosting DP productivity, information centers can reduce the backlog of end-user job orders that results from this problem, according to Livingston, a DP training coordinator for Blue Cross in Cleveland. "Average DP departments have job orders with deadlines that lapsed three to four years ago," he told the conference session, "yet DP workloads will increase by 45% annually.

"The information center must act as an instrument for bringing technological innovation to the corporation," Livingston said. "User management and their staff must come to understand the importance of technology and the corporate necessity for change. People must be made to feel a part of the change and not a victim of [it]," he added.

According to Mau, the information center is a business within the organization, which may itself be a business. The information center's market is people who need data retrieval and analysis, personal computing and certain administrative activities, she explained.

Mau said that information center functions include training of end users in computational tools that may be directly applied to their work; coordinating data usage by end users; providing an interface between the end user and the organization's data administration, operations and technical support departments; working with end users and DP management to plan and control end-user computing; and developing a network of experienced end users who draw on each other for assistance.

According to Livingston, the information center should also feature training resources that help prepare DP professionals for new technology. Country Mutual has estimated that 47% of the man-hours budgeted for its information center in 1981 were consumed by consulting activities.

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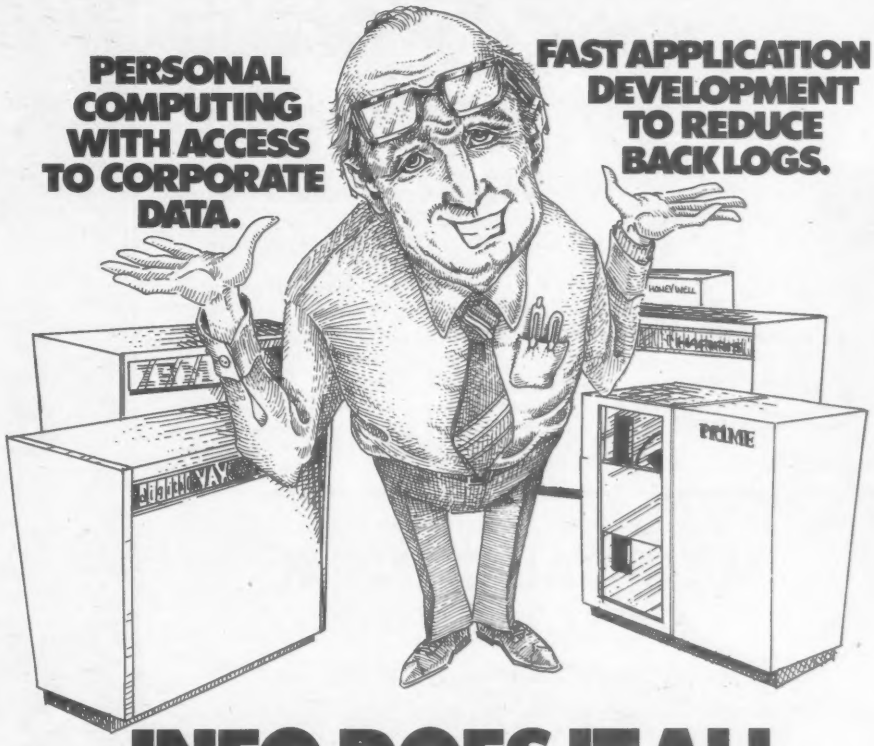

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Overcash, Abelson to Keynote EFT Association Convention

DALLAS — Reece Overcash Jr., chairman and chief executive officer of the Associates Corp. of North America, and Alan Abelson, managing editor of Barron's National & Financial Weekly, will be the featured speakers at the First Annual Convention & Exposition of the Electronic Funds Transfer (EFT) Association here May 16-19.

Abelson will address the opening session on "Planning for Tomorrow: What's Ahead for Business." Overcash will speak on the changing role of the banking industry.

Along with an exhibit showcasing EFT equipment, the event will also hold sessions on automatic teller machine shared-system and private network alternatives.

Registration for EFT Association members is $325; $450 for nonmembers. More information is available from the association at Suite 800, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

IEEE, Arizona State Meet To Cover Communications

PHOENIX — A conference on computers and communications sponsored by the Institute of Electrical and Electronics Engineers (IEEE), the Phoenix sections of the IEEE Computer and Communications Societies and Arizona State University will be held here May 10-12 at the Phoenix Hilton.

The conference, entitled Phoenix Conference on Computers and Communications (PCCC '82), will include discussions on "Electronic Defect Detection and Isolation"; "Design Methodologies, System Structure and System Deterioration"; and "Long-Term Electronic Industry Leadership — U.S. or Japan?"

Cost to attend the entire conference is $165 for IEEE members, $190 for nonmembers. Cost to attend a one-day session is $90 for members, $105 for nonmembers. A half day costs $65 for members, $80 for nonmembers. Additional information on the conference is available from PCCC '82 through P.O. Box 39486, Phoenix, Ariz. 85069.

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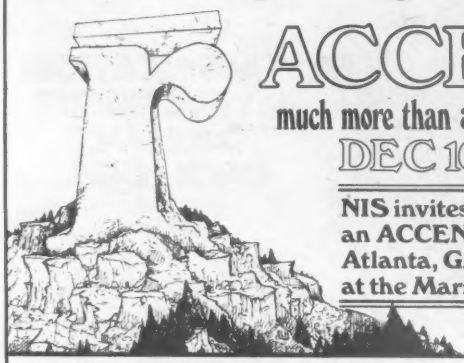

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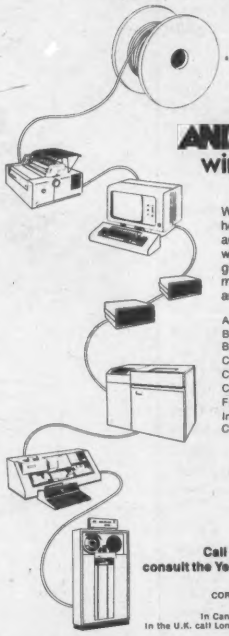

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DP Heads Called 'Political Pawns' of End Users

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — Many data processing directors are political pawns in their organizations and are forced to undertake dubious projects that cannot be economically justified, a senior manager said here recently.

Paul Connolly, vice-president of Professional Services at Informatics, Inc., claimed in a recent interview that the so-called project backlog in many large DP departments is full of items dictated by the whims of powerful user departments.

Connolly asserted that many end users perceive programmers as having lots of idle time. So the end users make demands for projects that they essentially see as free in-house work. The DP director is often forced to comply with these requests since ignoring them could threaten his position in the company, he said.

As a result, he added, the DP department often starts on projects that it knows cannot be implemented within the specified time frame and at the projected cost. Thus, DPers develop a reputation among end users of unreliability, inability to meet schedules and a tendency to go over budget, he said.

Pawns in Power Politics

"Clearly, as DP professionals we don't know how to estimate in business yet. The DP department, being a service organization, is often a pawn in the power politics of the organization," he said.

Connolly argued that DPers were in large part to blame for this situation. The technical professionals have given users the idea that computers can do anything. As a result, managers are throwing problems at the DP department and expecting immediate solutions.

Connolly also maintained there was some validity to user claims that programmers and analysts are underutilized in their organizations. If you ask programmers if they are fully utilized within their companies, "many of them will say no," he said.

"I say there is only a small shortage of programmers. It's more a structural thing. All over the place you see lots of little subgroups in large DP shops that are idle."

Connolly asserted there are forces underway in the industry that will result in more work being assigned to specialized outside contractors. This change, he insisted, was happening far more quickly and broadly than most people think.

Application system software is a fundamental part of a business operation, he argued, requiring specialized skills that often cannot be found in-house. This is particularly true, he said, with the proliferation of different operating environments, data base systems and microcomputers.

"All of these structural forces are going to create a change in the industry with DP moving from being an essentially in-house, internal service to an external service, which you can buy." User organizations, he said, will not be building everything themselves, any more than an oil company builds its own facilities.

Such change, he contended, is largely driven by strategic considerations. High-technology is critical to a company's performance and the risks are greater as a company goes further out on the leading technological edge. Therefore, reliance on one source, albeit internal, is dangerous. If the DP department fails, it takes the whole organization down with it, he said.

Outside Professional Services

Connolly also asserted that the increased shift to outside contracting will lead to increased specialization among systems analysts, programmers and designers. "Currently, there are nowhere near enough application specialists. It is ludicrous that when a programmer starts on a new project he has to learn the application from scratch."

The use of professional services in application development will, he argued, give rise to companies specializing in different areas. One possibility would be to sell partially complete application systems, which are then modified to meet customer specifications.

Connolly predicted such application specialists will become common in human resource systems such as pension funds, in inventory systems and in financial controls.

He concluded that with the increase in computing power at the user level, end users will be less inclined to wait for the DP department to provide them with solutions to problems and DPers will be less able to keep complete control of projects.

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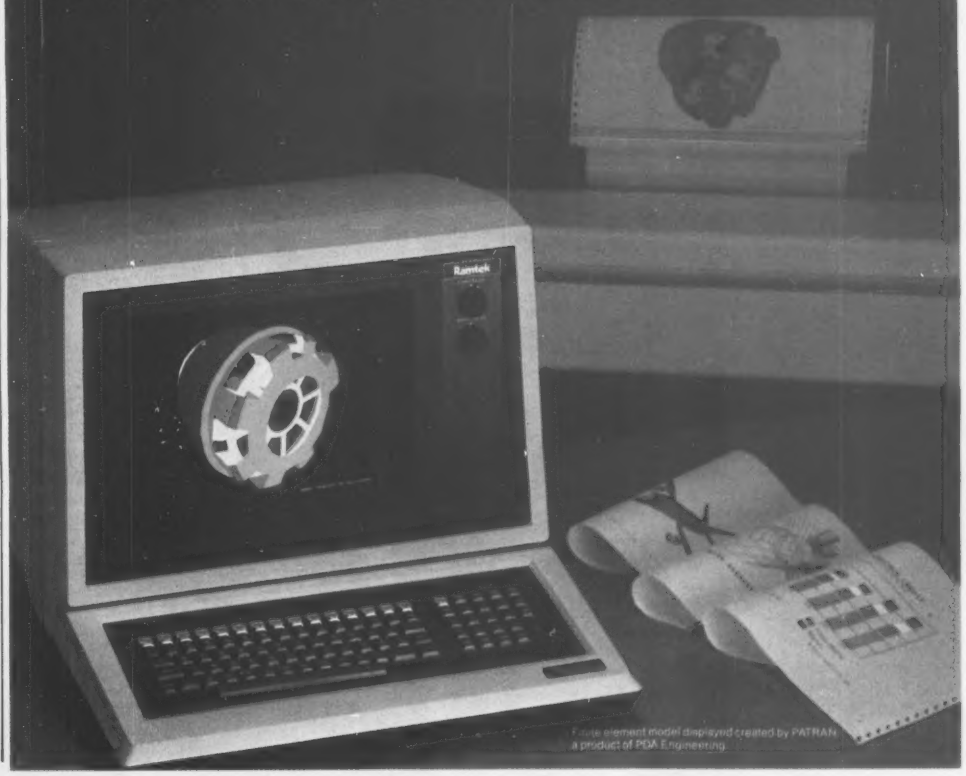

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NYPD Goes On-Line to Clarify 'Chaotic' System

By Bob Johnson
CW New York Bureau

NEW YORK — The New York City Police Department (NYPD) turned to on-line booking and prosecution management systems recently in an effort to make some sense of what it called a "chaotic and archaic" system of arrest records and paperwork.

According to department spokesman Capt. Gil Martin, two new systems are being installed in the five boroughs of New York City. The systems were designed to assist the NYPD and borough district attorneys to simplify the paperwork that now follows defendants' cases through the entire criminal justice system to the final dispositions by a district attorney or the courts.

At the center of the new in-house packages — Online Booking System (OBS) and Adult Justice Information System (Ajis) — are two IBM 370/158 CPUs. The mainframes are surrounded by multiple IBM terminals and printers, according to Martin.

The system plan first calls for terminals to be placed in all of the police precincts in the five boroughs for on-line arrest input. Later in the implementation schedules, terminals will be installed in the district attorneys' offices for disposition and cross referencing.

OBS is currently active at police headquarters in lower Manhattan and is expected to be in operation in Brooklyn shortly, Martin said. The Ajis prosecution system was installed in Staten Island and should be operational on a citywide basis in a few months, he added.

NYPD officials said the old system of arrest and booking has become so confusing that many cases — some involving serious crimes — become, in effect, lost and are never prosecuted.

According to Kenneth Conboy, deputy police commissioner in charge of legal matters, "The problem has become so bad that we are not even in a position to evaluate police work effectively. We cannot make intelligent decisions about police patrol and detective work in dealing with crime, largely because we do not know precisely what kind of arrests lead to convictions."

Alleviating Problems

The NYPD hopes that the new systems will alleviate some of its paper-related confusion. Currently, every arrest made by a police officer requires filling out and duplicating 15 different forms. Other problems include fingerprint records, which are typed six times on three separate cards and are then sent to the the state capitol of Albany for verification via facsimile. In addition, the arrest warrant procedure sometimes allows suspects to be freed before police become aware that the suspects are on the wanted list for other crimes.

Scattered records and the inability to cross-reference valuable crime statistics between the NYPD and the courts is hampering the department's efficient operation, Conboy said. Last year, for example, nearly two million forms were hand-written in the city's 73 station houses. OBS is expected to alleviate much of the confusion and manual work, he said.

Fingerprint processing will also hopefully become more efficient. Officials said that within an hour after fingerprints are fed into the system at central booking where they are relayed to Albany, police officers will be able to verify a suspect's identification. A "rap sheet" detailing arrest records will also be provided, officials noted.

The entire operation will now permit police officers to submit an arrest report consisting of just two forms to a desk officer who will enter the report into the system when the arresting officer is satisfied with the data. The prisoner is then fingerprinted and a warrant search is performed.

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(Continued on Page 27)

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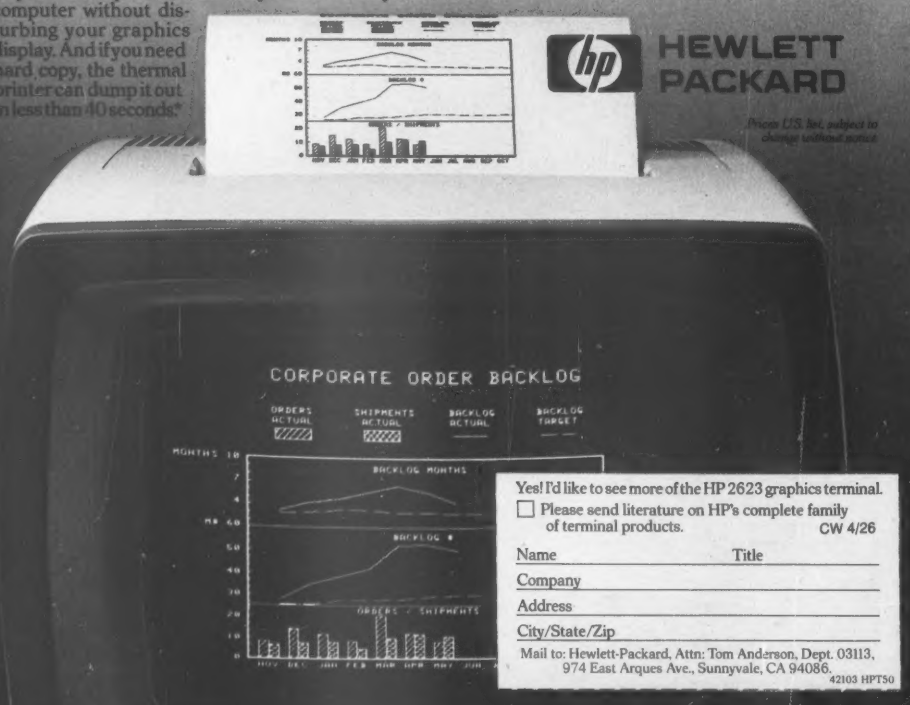

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NYC Officials Voice Concern Over NYPD Computer Links

By Bob Johnson
CW New York Bureau

NEW YORK — Despite progress in computerizing New York City's criminal justice system (story on Page 26), officials here have voiced concern over delayed and uncoordinated information and computer systems that do not "talk to each other."

Recent reports have told of criticism from the higher echelons of the city's police and court administrations, which cite problems tied to insufficient data resulting in delayed court cases and overcrowded jails.

The lack of coordinated data, according to the critics, also makes it difficult for the city's crime-fighting community to effectively address issues such as criminal statutes, bail assessment, sentencing practices and measuring courts' and judges' productivity.

Sources close to the situation state that the basic problem is not that the computer systems are defective but rather that criminal justice agencies have not linked the systems so that data can be easily shared.

Peter Nicholas, the city's director of criminal justice information services, said, "Until someone can look at the total picture of what is happening in the criminal justice system in the city, sound decisions regarding the placement of resources cannot be made." And Nicholas predicted major improvements from efforts such as the New York City Police Department's new On-line Booking System.

Future 'Grim'

Sceptics within the municipal government, however, maintain that based on past promises and long delays, the future of a smooth-running information network is grim. Aides to City Council President Carol Bellamy said that these undertakings have a history of "good intentions and poor project management."

Part of the blame for the city's problem lies with the state criminal justice system, critics claimed. The state, which is part of the city's overall information network, supplies on-line services from the capitol in Albany to various agencies within the city. Some observers maintain that these agencies have serious internal data gathering and supplying problems.

"Rap sheets" — records of criminals' arrests that help determine bail setting and arraignments — specifically came under fire. A product of the state's Division of Criminal Justice Services, the "rap sheets" were criticized for failing to provide police with adequate information about the outcome of arrests and the initial charges, which critics say could have serious consequences.

NYPD Installs On-Line System

(Continued from Page 26)

ing judge. Since the data will be processed and stored relatively quickly, the district attorney's offices can share crime records with the police.

The combination of information about arrest and prosecution will also enable the police to create crime-fighting strategies, the NYPD said. And a "career-criminal" data base, compiled over several years, will be incorporated into the system. This data base will help police officers determine specific characteristics of a given prisoner — whether he is considered dangerous, for example.

Historically, police officers have been hampered by huge numbers of complaints and have been unable to effectively computerize all of a given crime's details. But the police force hopes the new systems will provide the ability to make crime-fighting decisions based on computerized information.

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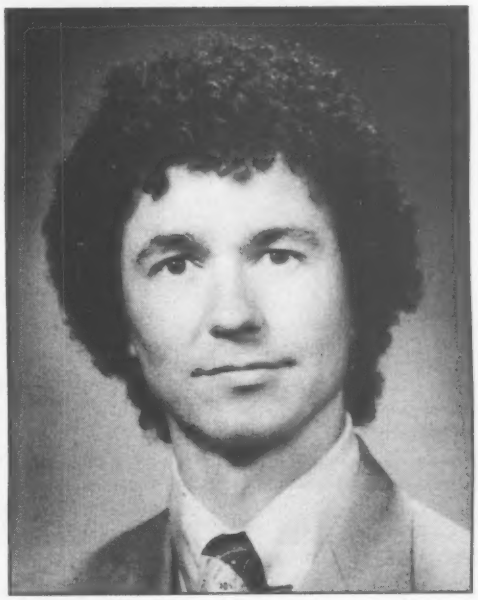

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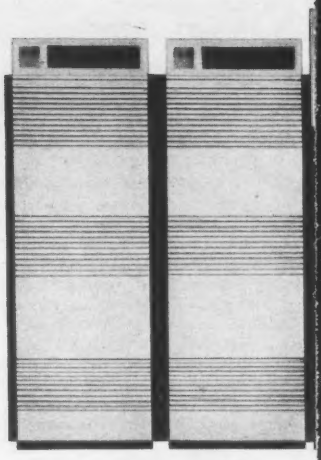

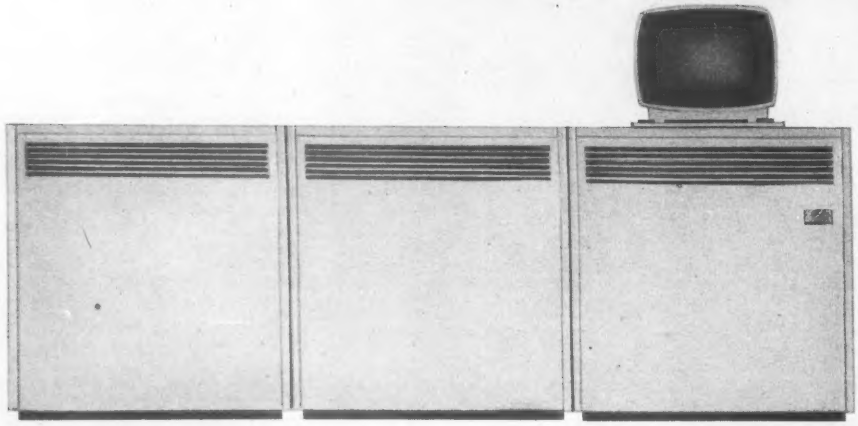

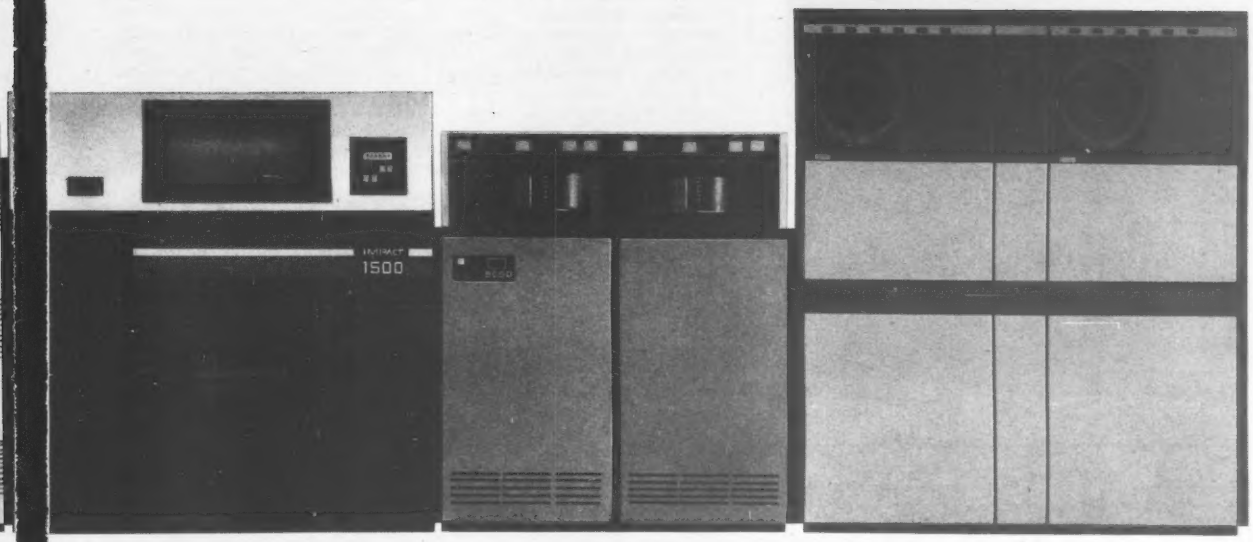

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Hardware Still Tops Software In DP Center Expenses: Exec

By Jeffry Beeler
CW West Coast Bureau

POMONA, Calif. — Most computing centers still spend significantly more for hardware than for software, and contrary to popular opinion, outlays for the two expense items have remained proportionally about the same, according to Werner Frank, Informatics, Inc.'s executive vice-president.

Although hardware prices have declined dramatically, computing equipment still consumes 30% to 40% of the typical company's total DP budget. Software, by contrast, accounts for a mere 10% to 20% of overall systems expenditures.

Both spending percentages have remained fairly constant for at least several years, Frank said during a recent conference sponsored by California State Polytechnic University.

Contradict Widespread View

Frank's observations contradict the widespread view that software costs are growing rapidly as a percentage of total DP spending, while equipment expenditures are steadily shrinking.

The reason hardware spending rates have stayed relatively stable rather than falling is that decreased unit costs have stimulated customer demand and prompted computing departments to buy equipment in ever-increasing volumes.

Although Frank challenged the notion that software costs are greatly outstripping their hardware counterparts, he reaffirmed industry concerns that application backlogs are rapidly expanding. In fact, he said, the queue of unimplemented applications now appears to be even longer than many experts had feared.

Frank bases his opinion on the results of a recent study by MIT's Sloan School of Management, which divided application backlogs into two major classes — "hidden" and "identified." The first class, whose existence few people had ever suspected, equals or even exceeds the size of the second, the study found.

Micros Absorbing Backlog

Part of the computing field's growing applications backlog will probably be absorbed by personal microcomputers, which will increasingly allow nontechnical end users to develop their own systems.

But to remedy the backlog problem completely, the information systems field needs to boost its productivity, especially in software development and maintenance. One suggested means of enhancing software-related productivity calls for computing professionals to increase their use of commercially available tools, methodologies and procedures.

Yet even if a company acquired the best of the development and maintenance aids and used them all at the same time, overall productivity would still be unlikely to improve more than 75%, Frank said. That estimated increase falls far short of the 1,000% productivity jump called for by industry experts like James Martin.

In other comments, Frank criticized the widespread tendency for programmers and systems analysts to rename familiar commands every time they develop a new piece of software. The practice of inventing new command nomenclatures, which usually mean exactly the same thing as their predecessors, has grown to "ridiculous" proportions and threatens to create a "command language Babel," he said.

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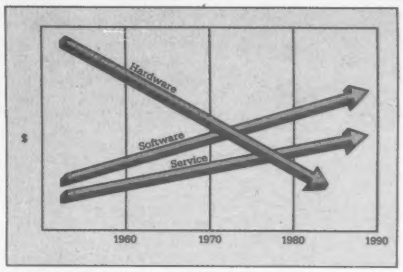
When the first fault tolerant computers were designed, software was the way to go. Hardware was expensive. But in the last 5 years there has been a dramatic reversal. People costs are going through the roof, while hardware components are the bargain of modern times. Stratus is the first company to build a continuous processing computer that takes full advantage of the hardware revolution...a computer that is designed to the economic realities of the present and the future.

As opposed to the Stratus hardware fault tolerant solution, the software approach requires performance stealing software in increasing increments. The more reliability required, the more software required, and the greater the burden.

Why more hardware works better than more software.

The crux of the problem with a software-based system is that it requires complex, performance stealing software to provide a system that will not stop. This software "robs" the system of resources because it uses processing cycles to pass status and checkpoint information back and forth between two computers. What's more, this passing of information usually occurs at four levels: operating system, user program, file management, and terminal control.

Stratus has eliminated this software burden with duplicate hardware components tightly coupled, dedicated to performing the same tasks at the same time. It's like having two computers in one, rather than two separate computers. Hardware checking logic continuously inspects for errors. When a failing component is found, it is stopped instantly. This means the Stratus/32 Continuous Processing system can: 1) Prevent a fault from contaminating the rest of the system. 2) Eliminate the need for complex recovery software. 3) Reduce repair time and service costs by pinpointing the failed component.



While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall.

Meanwhile, the duplicate partner is continuing with business as usual, without interruption.

Hardware is easier to implement.

One of the nasty side effects of software-based fault tolerant systems is that the analyst/programmer has the added complexity of working with two computer systems. Most are not accustomed to working this way. As a result, not only does application development require more time, but there is a constant risk of checkpointing too often, and thus destroying performance.

With the Stratus hardware-based solution, on the other hand, the analyst/programmer might as well be dealing with a conventional computer...one, not two. Stratus provides a familiar environment. The analyst/programmer doesn't have to make an extra effort to get continuous processing. He/she can take it for granted, with no performance penalty.

Stratus open ended growth. You add on, instead of replace.

The Stratus/32 is designed so that you can buy what you need when you need it...not more than you need in order to accommodate future growth. Yet, as you grow, you can *build* on what you have rather than experience the trauma of *replacing* what you have.

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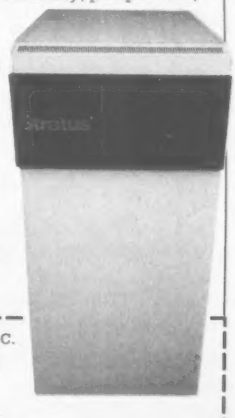
To complement our hardware approach to continous processing we have an impressive list of software. For instance: Virtual Operating System (VOS), Data Management System, CRT oriented command language, COBOL, Basic, PL/1, Networking with X.25, IBM Communications, full-screen editor, symbolic debugger, and a complete Word Processing package. And since fault tolerance is achieved by hardware, this software is unencumbered with complex "reliability" code.

$130,000. Software included.

A benefit not to be overlooked in the hardware approach to fault tolerance is the price advantage. The Stratus/32 Continuous Processing system is price/performance competitive with conventional computers that *don't offer a fault tolerance capability.* A fully duplexed configuration with 2 megabytes of memory, peripherals, and software can be purchased for under $130,000.



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How Should New Staff Be Treated?

Turnaround Time
By Larry E. Long

Q I switched jobs from a small to a large company in order to obtain experience with large computer systems and data communications. In my 10 years as a programmer, I have never been so bored.

What little work I am doing would be considered entry level. I am being compensated for my 10 years experience but am treated like a new recruit. Is this typical of large organizations? Can I expect the situation to improve or should I start looking?

A I have received similar feedback from experienced professionals who have accepted employment with other companies. The "old heads" sometimes adopt a more-knowledgeable-than-thou attitude. This attitude promotes the waste of personnel resources. A 10-year professional has already been in a few fires. If anything, an experienced professional should be treated as a learned stranger and his expertise tapped for new perspectives.

The worst thing you can do with a seasoned professional in a new job is to bring him along slowly. This is not a good idea for recent college graduates either. My recommendations to your manager and any manager hiring an experienced professional is to give him the standard company orientation, ask his opinion initially and often thereafter, then throw him to the wolves. Challenges are not only more fun, but they expedite the learning process and promote a more productive department.

Q My boss is the vice-president for Business Affairs and treasurer of the college. He is retiring. I am now the director of the computer center and have applied for his job. He is on the search committee for his replacement, and for that reason says he cannot write me a letter of recommendation. I have no cause to believe that there would be any other reason. Do you think his excuse is valid?

A Anyone has the right to refuse to write a letter of recommendation. However, if your manager would have agreed to write a positive recommendation on your behalf to another institution, then he is overreacting to a fairly common situation.

Your resume should list your manager as a reference. If you are deemed a candidate, and if letters are invited from other potential candidates, your manager should respond with a letter to the search committee. The committee should treat in-house applicants in a similar manner to those from outside the organization. In this way the format of all applicant portfolios will be consistent and will not bias the evaluation process.

Q A friend and I are considering resigning our positions with a large company and going into the consulting business. Between us we have 25 years of business programming experience. Both of us have excelled in a variety of programming languages and feel we are qualified to develop and program just about any kind of system.

We would be interested in any ideas that you would have that would help us get started. What should we charge as an hourly rate for programming?

A I don't mean to dampen your enthusiasm, but you are going to have a lot of competition. The work is there, but don't expect a flood of clients the moment you open for business. Be prepared for some lean months during the first year.

Unless you are independently wealthy, try to secure reasonably steady work for the first five or six months prior to resigning. Use this work as leverage to get more work. You can test the water through casual conversations at professional society meetings and with close friends.

Don't hang out your shingle before notifying your employer of your resignation. It may backfire. You, and anyone else in similar circumstances, have an obligation to your employer. Make sure your current projects are clean, well documented and can be easily transferred to someone else for completion.

The hourly rate for contract applications programming is a function of geography and the prestige of the company. Rates vary from $15/hour to $55/hour.

Geography notwithstanding, I would consider $25/hour an absolute minimum.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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May 14, Waltham, Mass. — **Data Entry Management Association Vendors Day.** Contact: Best Western East, 477 Totten Pond Road, Waltham, Mass. 02154.

May 17, San Francisco — **Introduction to APL.** Contact: I.P. Sharp Associates, Inc., Suite C-415, 900 N. Point St., San Francisco, Calif. 94109.

May 17, Buffalo, N.Y. — **Solving the Productivity Puzzle: The Engineering of Information Systems.** Contact: Joanne Starr, Computer Task Group, Inc., 800 Delaware Ave., Buffalo, N.Y. 14209.

May 17-18, Houston — **Using Cost Effective Computerized Techniques for Productivity Improvement.** Contact: Maynard Management Institute, Suite 2615, One NCNB Plaza, Charlotte, N.C. 28280.

May 17-18, Houston — **White-Collar Productivity Challenge.** Contact: Maynard Management Institute, Suite 2615, One NCNB Plaza, Charlotte, N.C. 28280.

May 17-18, Boston — **Magnetic Tape Library Management Seminar.** Contact: Tape Library Consulting, 3 Rock Road, Yardville, N.J. 08620.

May 17-19, Arlington, Texas — **Project Management and Control.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 17-19, Philadelphia — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Inc., 11928 Earlham, Orange, Calif. 92669.

May 17-19, Boston — **Data Communications.** Contact: American Management Associations, 135 E. 50th St., New York, N.Y. 10020.

May 17-19, Minneapolis — **Information System for Effective Management.** Contact: Executive Development Center, University of Minnesota, 324 Management and Economics, 271 19th Ave. S., Minneapolis, Minn. 55455.

May 17-19, Boston — **Designing Security Controls for Computerized Systems.** Contact: MIS Training Institute, Inc., 12 Juniper Lane, Framingham, Mass. 01701.

May 17-19, New York — **Hot New Stuff in Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

May 17-20, New York — **CICS/VS Systems Design.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

May 17-20, Los Angeles — **Developing Integrated Purchasing/Account Payable Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

May 17-20, Arlington, Texas — **Structured Programming: Techniques for Productivity.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 17-20, Washington, D.C. — **IMS/VS Application Development Facility.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

May 17-21, Pittsburgh, Pa. — **Structured Design & Programming Workshop.** Contact: Bill Schoonmaker, BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

May 17-21, New York — **Design Techniques Workshop.** Contact: Bill Schoonmaker, BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

May 17-21, Toronto — **Graphics Interface '82.** Contact: Graphics Interface '82, Suite 200, 961 Eglinton Ave. E., Toronto, Canada M4G 4B5.

May 17-21, Hartford, Conn.

(Continued on Page 36)

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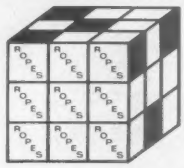

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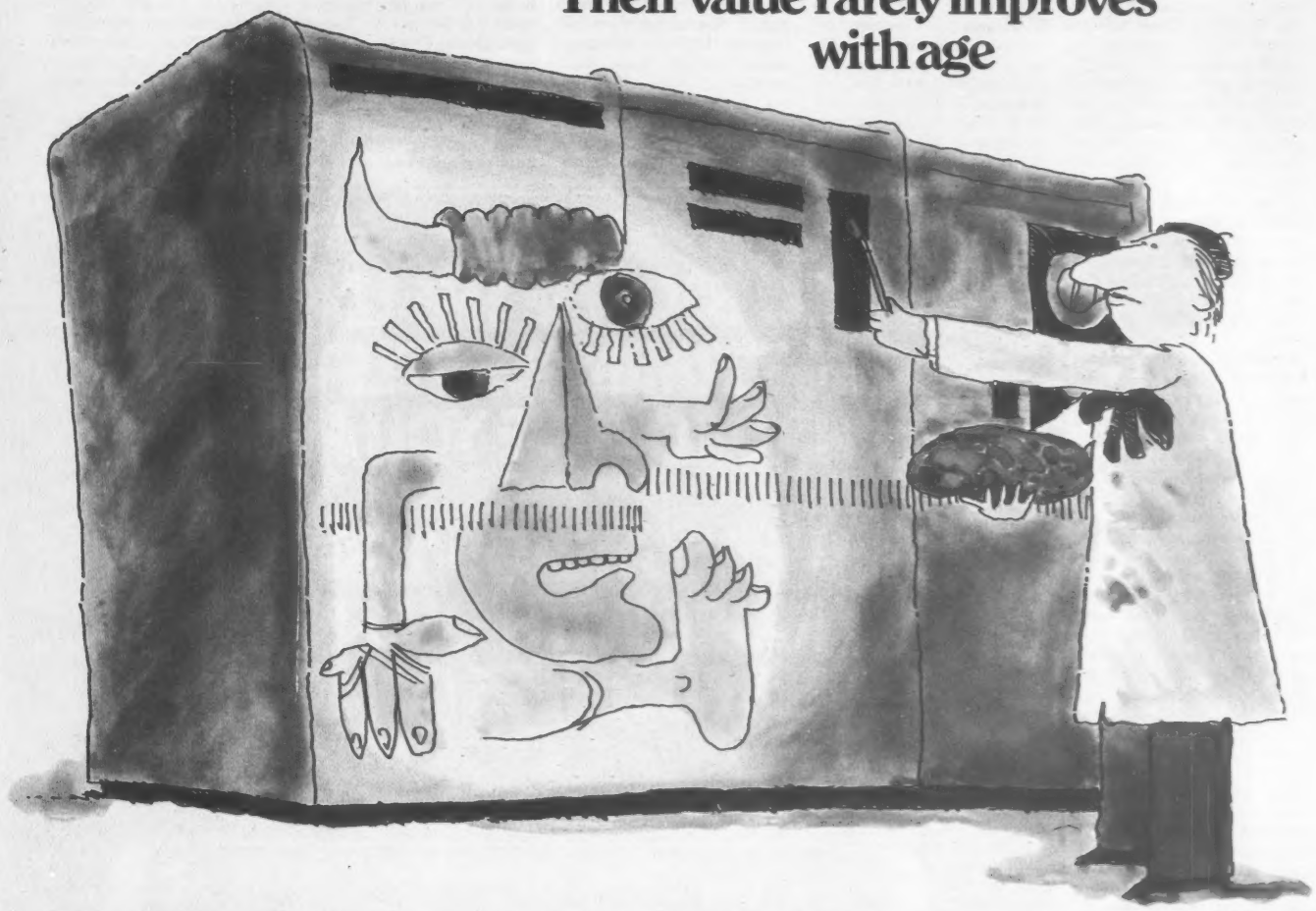

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(Continued from Page 34)

— **JES3/MVS-System Product External Communications and Control.** Contact: Computer System Research, Inc., 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

May 17-21, Chicago — **CICS Command Level Programming.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 17-21, Boston — **Systems Design Workshop.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 17-21, San Francisco — **DP Disaster Recovery Seminars.** Contact: DP Security, Inc., 181 West St., Waltham, Mass. 02154.

May 17-21, New York — **Design Technique Workshop.** Contact: Chubb Institute Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

May 17-21, New York — **CICS Command Level Programming.** Contact: David Shapiro, Sysed, One Park Ave., New York, N.Y. 10016. Also being held in Chicago, May 17-21.

May 17-21, Hartford, Conn. — **CICS Internals.** Contact: Amdahl Corp., 1 Corporate Center, Hartford, Conn. 06103.

May 17-21, Houston — **IMS/VS Data Base Design.** Contact: David Shapiro, Sysed, One Park Ave., New York, N.Y. 10016.

May 17-21, Tampa, Fla. — **Software Maintenance: Tools, Techniques and Management Strategies.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

May 17-21, Los Angeles — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011. Also being held in Richmond, Va., Portland, Ore., and Pittsburgh, Pa., May 17-21.

May 17-21, Cambridge, Mass. — **Briefing and Programming Workshop.** Contact: Office of Special Programs, Polytechnic Institute of New York, 333 Jay St., Brooklyn, N.Y. 11201.

May 18-19, Philadelphia — **Effective Presentations.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D Plaza, Box 181, Wellesley, Mass. 02181.

May 18-21, Chicago — **Data Analysis.** Contact: Information Methods (U.S.A.) Corp., 504 Totten Pond Road, Waltham, Mass. 02154.

May 18-21, Minneapolis — **Structured Design & Programming.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 19, New York — **Data & Information Content Providers Talk Back to Suppliers & Vendors.** Contact: Information Industry Association, Suite 400, 316 Pennsylvania Ave., Washington, D.C. 20003.

May 19-20, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

May 19-20, Houston — **Control Labor Costs With Better Reporting Systems.** Contact: Maynard Management Institute, Suite 2615, One NCNB Plaza, Charlotte, N.C. 28280.

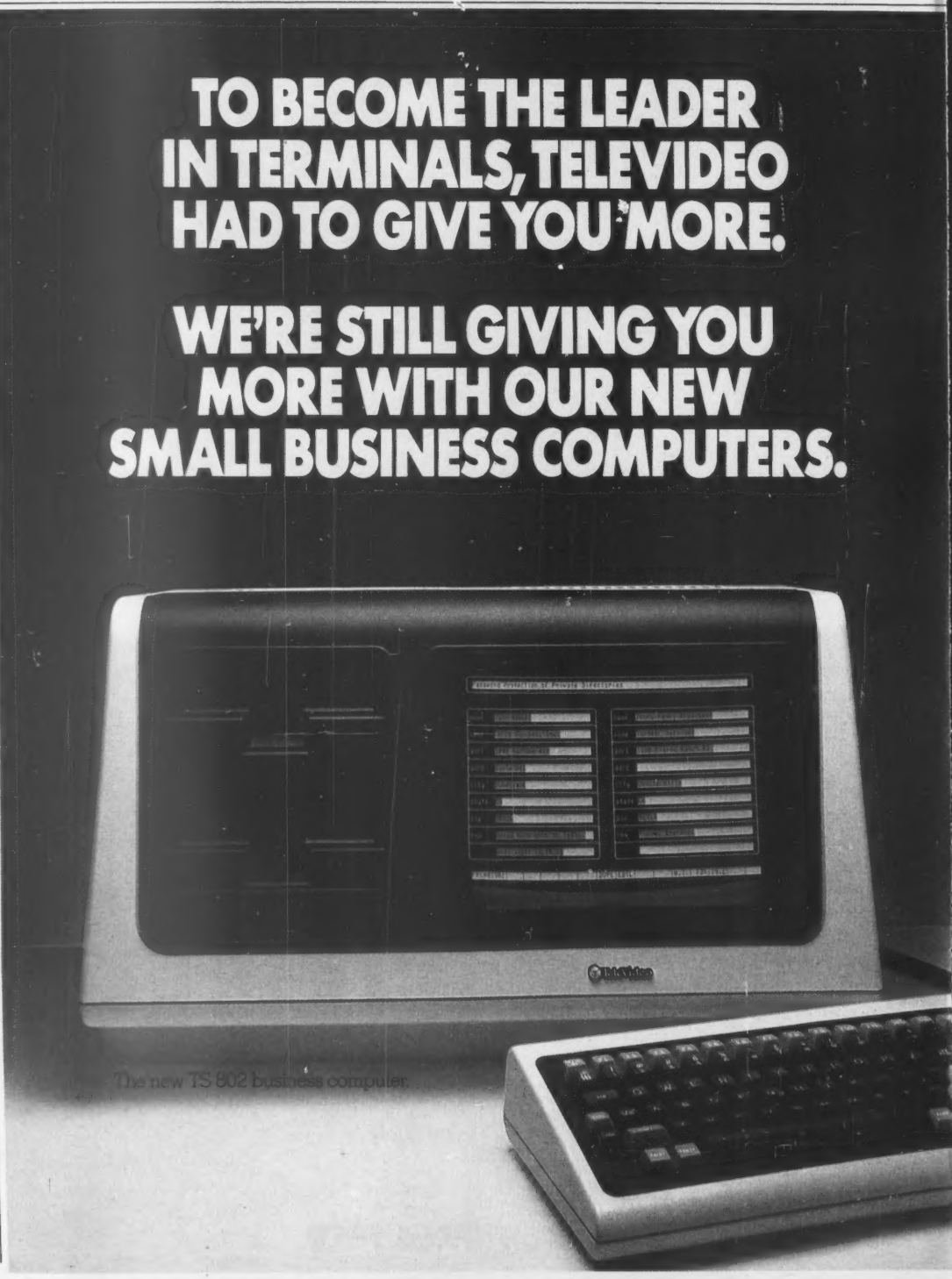
May 19-20, Houston — **From Quality Circles to a Total Team System.** Contact: Maynard Management Institute, Suite 2615, One NCNB Plaza, Charlotte, N.C. 28280.

May 19-20, Washington, D.C. — **Distributed Systems: Concepts/Management Overview.** Contact: Datamation, The Datamation Institute, Seminar Coordination Office, 850 Boylston St., Chestnut Hill, Mass. 02167.

May 19-20, Philadelphia — **Manufacturing Applications of Computer Graphics.** Contact: Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48128.

May 19-21, Chicago — **Data Analysis.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 19-21, Chicago — **Fundamentals of Data Processing for the Non-Data Pro-**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cessing Executive. Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

May 19-21, Atlanta — **Word Processing Implementation Workshop.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

May 19-21, Chicago — **Information Resources Management.** Contact: U.S. Professional Development Institute, Silver Spring, Md. 20904.

May 19-21, New York — **Managing the Corporate DP Function.** Contact: Information Systems & Technology Division, American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

May 19-21, Waltham, Mass. — **Fundamentals of Microprocessors.** Contact: Bentley College, Center for Continuing Education, Beaver & Forest Streets, Waltham, Mass. 02254.

May 19-21, Los Angeles — **Strategic Planning for Office Automation.** Contact: Advanced Office Concepts Corp., Suite 433, One Bala Cynwyd Plaza, Bala Cynwyd, Pa. 19004.

May 20-21, Washington, D.C. — **Magnetic Tape Library Management Seminar.** Contact: Tape Library Consulting, 3 Rock Road, Yardville, N.J. 08620.

May 20-21, Chicago — **SAS Advanced Input/Output Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

May 20-21, Arlington, Texas — **Writing for Results: A Workshop for DP Professionals.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 20-21, Bethesda, Md. — **Satellite Technology for Managers and Executives.** Contact: Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

May 20-21, Washington, D.C. — **The Implications of the AT&T Settlement.** Contact: Telestrategies, Inc., Suite 102, 6842 Elm St., McLean, Va. 22101.

May 22, Norman, Okla. — **Fifth Annual University of Oklahoma Microcomputer Conference.** Contact: Dr. Richard D. Andree, 423 Physical Sciences Center, 601 Elm Ave., Norman, Okla. 73091.

May 22-23, Vail, Colo. — **Man Machine Interface.** Contact: Continuing Education Institute, Suite 1000, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

May 23-25, Andover, Mass. — **The Digital Facsimile Explosion.** Contact: Institute for Graphic Communications, Inc., 4th Floor, 375 Commonwealth Ave., Boston, Mass. 02115.

May 24-25, Boston — **Digital PABX.** Contact: American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

May 24-25, Orlando, Fla. — **Software Requirements and Design.** Contact: Data Processing Management Associates, Education Foundation, P.O. Box 91295, Los Angeles, Calif. 90009.

May 24-25, Orlando, Fla. — **Software Requirements Analysis and Design.** Contact: Education Foundation of the Data Processing Management Association, P.O. Box 91295, Los Angeles, Calif. 90009.

May 24-26, Denver — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Inc., 11928 Earlham, Orange, Calif. 92669.

May 24-26, Washington, D.C. — **Aerospace & Defense Computer Conference.** Contact: Aerospace Defense Computer '82, P.O. Box 91295, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

May 24-26, New York — **Data Processing for the Non-DP Executive.** Contact: Chubb Institute Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

May 24-27, Paris — **Twelfth International Symposium on Multivalued Logic Systems.** Contact: Symposium Secretariat, Institute D'Informatique d'Enterprise, Conservatoire National Des Arts Et Metiers 292, Rue Saint-Martin, 75141 Paris Cedex 03, France.

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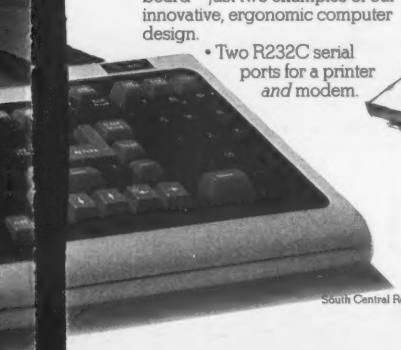

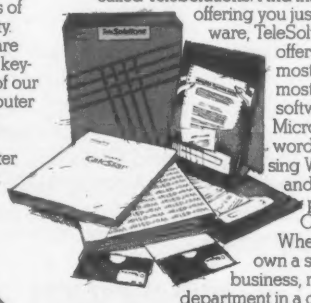

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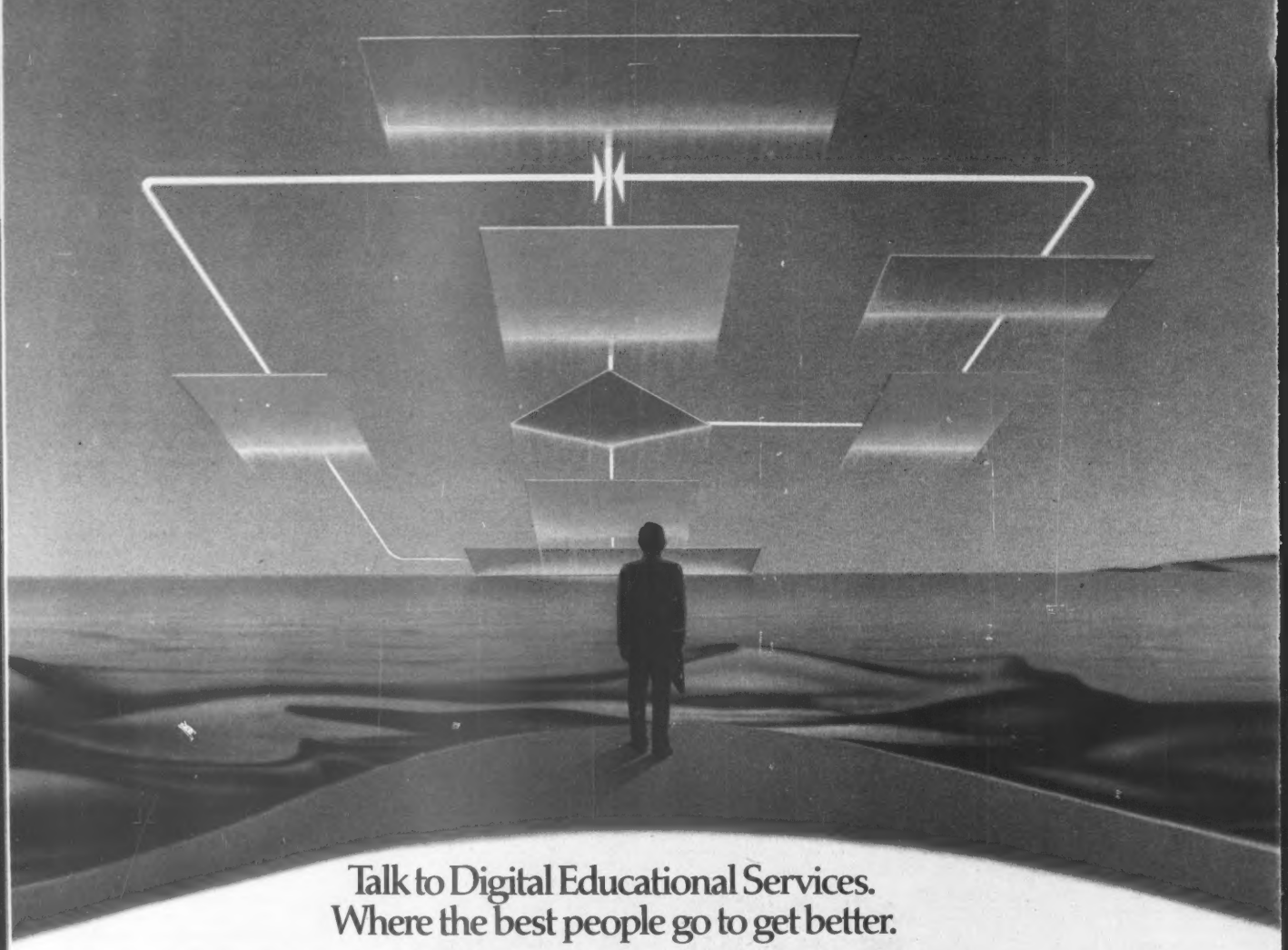

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Information System Boosts Tractor Dealer's Operations

CHARLESTON, W. Va. — An information processing system has enabled a growing tractor dealership here to speed up operations and dispense with two service bureaus.

Installation of an IBM 370/138 in late 1979 by the Cecil I. Walker Machinery Co., a Caterpillar Tractor Co. dealership, helped to improve cash flow, cut invoice processing time from 21 days to 48 hours and establish a 20% reduction in warehouse inventory levels. It also resulted in faster restocking of parts for repair shops and provided status reports of inventory items available from any of the nearly 100 video terminals tied into the on-line system linking the headquarters here with Walker outlets in other West Virginia cities.

Richard Walker, company president, said the firm formerly used a national service bureau for inventory control and invoicing and a local service bureau for financial applications and reporting.

However, Walker's growth began to outstrip the ability of both bureaus to deliver necessary information when needed.

"When you go with a batch system you're always late getting information out," A.S.J. Southworth III, vice-president of finance for Walker, said. Because the bureaus required between two and three weeks to respond to management needs, Walker made the decision in 1976 to get an in-house system, he said.

After checking with other dealers using in-house systems, studying data processing systems and getting some help from Stockton-Bates & Co., a Philadelphia consulting firm, Walker installed the IBM 370/138.

Walker examined system proposals from Honeywell, Inc., Digital Equipment Computer Corp., National Cash Register Co., Burroughs Corp. and IBM, but the company decided to go with IBM, Southworth said, because it provided an option the other companies did not.

The IBM 370 enabled each department to put major assets such as equipment, work-in-process inventories and receivables on-line, Walker said. Company officials wanted to know which assets needed immediate attention in order to keep sales high while keeping inventory low.

There was a two-year time lapse, Southworth said, between Walker's decision to go with an in-house system and final implementation. Software was written by Walker's in-house technical staff members. However, by March 1980 Walker had reached the limits of the 370, Southworth said. Interim IBM 370/148 and 3031 systems were used before the company obtained the 4341 processor currently in use.

The operating environment also includes IBM's Systems Network Architecture (SNA), which enables users to share terminals across systems applications. SNA helped improve communications line efficiencies to help hold down costs and provide flexibility for Walker. Approximately 135 peripherals are scattered throughout the company's main and branch units.

More than half of Walkers' customers purchase or rent Caterpiller Tractor equipment or other heavy machinery for mining, road building, logging and other construction-related industries. Each of these industries has a heavy down-time cost which makes it essential that Walkers' 500 employees know what equipment to keep on hand and when to make repair jobs.

"I really hate to quote dollars, cents and percentages," Southworth said, "but we had a definite reduction in our parts inventory of 20%." The company can reduce its inventory within 30 days if necessary, he added.

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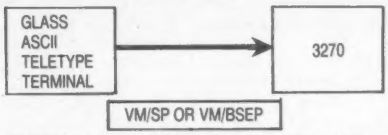
3270 SIMULATION WITHOUT HARDWARE BOXES UNDER VM/370



SIM3270 is a disconnected VIRTUAL MACHINE running under VM/370 that allows most asynchronous HALF DUPLEX TTY terminals to be supported as simulated 3270 terminals. The TTY now looks like a 3270 to VM/370 thus opening all the FULL-SCREEN facilities available to a 3270. NO modifications are needed to VM/370 and NO hardware.

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DEC	VT/52 and VT/100

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EDITORIAL

Growing Uneasiness

Management information systems managers will have to wake up fast to a growing uneasiness in the DP ranks if recent industry analyses are anything to go by.

Experts in the field are becoming aware of an increasing frustration among programmers, systems analysts and other highly trained computer specialists who feel boxed in by a set of forces that undermine their morale. According to one recruiting firm executive, these forces include:

- The limited career paths being offered to technical specialists.
- Too much concentration on maintenance and technologically obsolescent work.
- Lack of a well-defined promotion path that will give DP specialists an entry into management ranks without being forced to leave their technical peer groups.
- Pressure to take on projects that cannot possibly be met at forecast cost and on time.

These trends, if they continue, spell danger for the DP manager, pressured as he already is to increase the productivity of his department. There is already evidence that more and more programmers and analysts are going it alone, turning themselves into free-lance specialists or joining the growing ranks of DP consultants.

High employee turnover has always been with us, particularly in the clustered areas of the computer industry such as Silicon Valley, where the DPer can literally turn to the shop next door for a new job.

The time is opportune to take a critical look at how DP managers are shaping the career paths of those whose skills and resources are indispensable in the information age. Ideas now in circulation include an increased commitment to cross-training so that DPers are better versed in a variety of work assignments, more emphasis on applications systems development and more project development work dealing with leading-edge technology.

Without endorsing any specific proposals, we suggest the time is now ripe to take a fresh look at career opportunities for those who spend their working lives inside the DP department.

Historically, DP personnel have not entered the ranks of top executive-level management in the user community in any great numbers. They have been hampered by a lack of the fundamental traits considered necessary to make a highly competent manager — good communications skills, an appreciation of the overall business picture and the willingness to forego the technical aspects of their jobs.

Yet at a time when information is the critical ingredient in the management process, DPers want to have their status recognized. Until now, the approach has been one of "how do we get DP professionals to acquire these missing skills?" That may still be a legitimate approach, but the recent debate brings some interesting new thinking to the arena. It deserves a serious appraisal.

'But rest assured, folks, we'll be glad to inform you that you have a need to know, if that should ever become the case!'

DATA PAST

Five Years Ago
May 9, 1977

WASHINGTON, D.C. — The system for bringing large antitrust cases to trial fell apart, particularly in the Southern District Court of New York where the federal government's antitrust case against IBM was being tried. That was one point of agreement to come out of hearings before the Senate Antitrust and Monopoly Subcommittee.

Ten Years Ago
April 26, 1972

WASHINGTON, D.C. — After almost 3½ years the Justice Department gave "top priority" to its antitrust suit against IBM.

And it appeared likely that the case would end up in court instead of in a consent decree as was the case with the two previous government antitrust actions against the industry giant.

LETTERS

Twisted Reasoning?

Joseph Tabacco's letter to the editor concerning the dismissal of the IBM antitrust case [CW, March 22] shows the twisted reasoning used by proponents of antitrust laws.

Before I go any further, let me state that I am not and never have been associated with IBM in any fashion. In fact, I am totally unimpressed with the products they turn out. However, I believe William F. Baxter made the only rational choice possible in agreeing to end litigation. Let us examine Tabacco's arguments one by one.

First, he demands an "immediate congressional investigation of Baxter's conduct." How many hundreds of thousands (dare I say millions) of dollars should we spend investigating a small consulting fee? In fact, if you are at all familiar with Baxter's background, you would realize that his consulting work for IBM had very little impact on his decision.

For more than 20 years, Baxter has taught and written about antitrust regulation. He has long advocated minimal enforcement of antitrust laws. His decision to drop the case was entirely consistent with his background.

Second, Tabacco claims that IBM is still monopolizing the "general-purpose digital computer systems" market, as it did in the 1960s (I assume he means large mainframes — otherwise his comments don't make sense). He conveniently dismisses the radical changes in the computer market since then.

In the 1960s, the large mainframe market was the only computer market in existence. Today that is no longer the case. He also assumes that no competition exists between different types of computers (mainframes vs. distributed networks of minis). In fact, companies are increasingly turning away from large mainframes to distributed networks of smaller computers.

We cannot treat one segment of the computer market in isolation from the general market for computing power. This is especially true when yesterday's large mainframe is less powerful than today's micro. In reality, IBM's share of the total market for computers is dramatically smaller than it was 12 years ago. I might add that this occurred without government intervention in the marketplace.

Third, Tabacco argues that "the dismissal was an affront to American taxpayers who bore the costs of this litigation." In other words, because we have thrown $18 million to $26 million down a rat hole, we should throw more money after it. This is one taxpayer who is glad to see this boondoggle for lawyers ended.

Fourth, he argues (as all antitrust proponents do) that antitrust laws promote competition. Any idea that the government (the most anticompetitive force in the economy) must watch over businesses to insure competition is absurd.

In reality, antitrust laws are the most profoundly anticompetitive laws on the books. The only organizations protected by antitrust laws are special interest groups and inept businesses unable to compete. The consumer has never benefited from any antitrust case.

Finally, I would ask Tabacco to abide by the same standards he asks Baxter to follow. In other words, is he complaining about the IBM dismissal because it heralds a long-needed decline in antitrust cases that will hurt his pocketbook?

Scott L. Eudaley
Torrance, Calif.

SOFTLINE /Werner L. Frank‡

The Evolution of Microcomputer Software

The mainframe computer evolution took place over a 30-year period. Comparable progress in the microcomputer marketplace has transpired in less than five years.

This brief history is illustrated by highlighting a few examples of hardware and software offerings (see chart). The progression of this chart is ordered so that entries in each successive step embody the capability of previously listed offerings.

The first microprocessor-based computers appeared in the mid-'70s when several kits became available for constructing one's own computer.

Beginning of an Industry

Shortly thereafter, an economically viable industry began when Tandy Corp. introduced its off-the-shelf TRS-80 Model I computer through the Radio Shack retail outlets.

This device, priced at $599 in 1979, was aimed at the hobbyist. It provided an 8-bit processor, an auxiliary cassette storage unit and a 4K-byte memory. Memory expansion up to 16K bytes was an option, as was several hundred thousand bytes of floppy disk storage. The initial software attraction consisted of a rudimentary, but excellent, read-only memory-based Basic interpreter and some games.

This introduction was a notable success. In three years, more than 100,000 such computers were sold, exceeding the entire worldwide population of larger computers at the time. The commercial success of this endeavor did not go unnoticed, stimulating an industry that has since dramatically broadened in market scope and technical depth.

Computer	Environment	System Impact: Software	System Impact: Hardware
TRS-80, Model I	Hobby	Games Basic	8-bit processor 16K-byte memory 300K-byte floppy disk
Apple II	Business	Fortran Cobol Visicalc	64K-byte memory Expansion slots
Xerox 820	Professional	CP/M Wordstar	1M-byte floppy disk Communications standards Full screen
Altos ACS8000	Extended Business	MP/M II Peachtree	208K-byte memory Multiterminal Hard disk
IBM Personal Computer	Superprofessional	IBM DOS CP/M-86 Pascal	16-bit processor, 8-bit bus 256K-byte memory Graphics, audio Expanded keyboard
Altos ACS8600	Complex Business	MP/M-86 Xenix	16-bit processor, 16-bit bus to 1M-byte memory to 80M-byte disk storage
Convergent Technologies IWS/AWS	Cluster	Ctos	Multiworkstations Networking Expanded screen

Scenario of a User's Evolving Microcomputing Environment

Following close behind the TRS-80 was the introduction of the Apple II computer by Apple Computer, Inc. Apple II moved hardware a step forward by allowing memory expansion to 64K bytes and facilitating the attachment of peripheral devices through easily accessible expansion slots.

Systems software was broadened by making available some of the big-system computer languages such as Cobol and Fortran. The focus of this machine shifted from games to business, helped immensely by the introduction of Visicorp., Inc.'s Visicalc, a new piece of software that automated the calculations associated with accounting spreadsheets.

Both Tandy and Apple had chosen to stake their futures on proprietary operating systems. Language standards, however, began to emerge mainly through the efforts of Microsoft Computer Products, Inc.'s interpreters and compilers.

The overwhelming success of these top vendors attracted many competitors, such as Commodore Business Machines, Inc., Ohio Scientific Memory Products, Inc., Exidy, Inc., Cro-

(Continued on Page 42)

HUMAN CONNECTION /Jack Stone‡

User Turned Analyst Sees the DP Light

This is the conclusion of a series on new users learning to cope on the job.

"For the umpteenth time, the users have changed their minds about the data elements. At this rate, I'll never finalize the record design."

This utterance, heard so often in the computer room, was not issued by a hard-bitten, dyed-in-the-wool DPer, but rather by a hard-nosed, mercurial user who, through a fluke of fate, was converted to the position of lead analyst on a mini-based system development job and found the data processing faith.

Ira Schoen, responsible for handling the office automation project for his government directorate, had come full circle: His perceptions had shifted from those of the frustrated user to those of the frustrated computer systems analyst.

Deepening Concern

I became concerned that file talks would continue beyond the installation date and the machines would come up, but the software would be down.

However, unbeknownst to me, Ira had sent more than 100 people — most of the clerical staff and much of the professional staff — to basic word processing training, having planned all along to start up operations with WP as the first application. "My users must be acclimated before they attack a data system," Ira declared.

And when it appeared that the debate over field definitions was becoming unduly lengthy, he put his foot down, ended the discussions and obtained the resolutions. This was feasible because, unlike analysts from DP departments, Ira represented his directorate's executive office, which had the authority to force decisions.

Thereafter, the system installation was a piece of cake. Shortly after the hardware was up and running, a primary user entered test data and suggested some file changes, Ira's assistant reformatted the file a few minutes later using generalized software, users began entering operational data, and the data system was on-stream.

Near the end of the project, Ira let his hair down and stated: "After this experience, I can see why it's tough for computer centers to deal with users like me. As a DPer, I sure wouldn't want to have hundreds of Ira Schoens riding me all the time. But I wouldn't mind a few of me running around to make sure that something gets done.

"In retrospect, I did a lot of things on the project right, even though I had to use hunches and common sense to guide me rather than data processing experience. But I made some mistakes. My ignorance of the technology sometimes led me in the wrong direction, and I think I've become a lot more knowledgeable in this area.

"It also bothered me that, on occasion, I lost perspective. I looked at the systems situation from my own microcosm and forgot that I was a member of a systems team, along with our DP people, consultants, vendors and users, all of whom were working toward the solutions of our problems.

"For example, I was a dissatisfied user of the Wang Laboratories, Inc. product line, but when I explained my needs to the proper Wang people, they responded beautifully and continue to do so.

"My experience has also taught me to take a 'macro' view of our agency's systems technology program, a truly innovative effort for which the U.S. International Communications Agency has many reasons to be proud.

"Up until a few years ago, our headquarters operations and overseas posts were way behind in the use of computer technology.

"Then the DP operation was elevated in the organization and assigned responsibility for all electronic office systems and communications. Capable and experienced managers were brought on board, a practical long-range plan was developed, and now we have a highly effective, worldwide office automation program underway.

"I am pleased to be a part of the program and congratulate our agency's systems technology people for their fine efforts."

The story I have related is true and Ira Schoen is a real character. My thanks to Ira for his candor, his cooperation and, most of all, his sense of humor, which he has maintained through difficult times.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

The Fast-Growing Evolution of Software

(Continued from Page 41)

menco, Inc. and Durango Systems, Inc. Some of the early entries, however, have dropped out of the race, and some were absorbed by other entities.

The device on which this commercial activity depended, and which became known as the personal computer, moved another bold step forward in a short time. This resulted from a software endeavor of significant proportions, the CP/M operating system, which was developed by Digital Research, Inc. and became a de facto standard for all but a few of the largest suppliers.

The economic rationale for standardization was clear. A good long list of applications software was developing under CP/M. Hence, new hardware systems could attract this software as long as CP/M became the host operating system.

Transportability of software, however, does not depend on operating systems alone. The implementation language is also a necessary factor. Thus, the coupling of the popular CP/M operating system with the widespread Microsoft Basic (MBasic) really became the vehicle that made it easy to accomplish software proliferation and exploitation.

The recognition of leverage from software through standardization was not restricted to hardware manufacturers producing new systems. Innovative peripheral suppliers noted the possibility and practicality of enhancing non-CP/M machines, such as the Apple and TRS-80, by attaching a modest hardware/software unit that turns the native machine into a CP/M host. Suddenly, software became the leader and, as in the case of the mainframe computers, the microcomputer hardware began its chase after software.

The impact of CP/M can be gauged by the fact that several hundred manufacturers, both domestic and foreign, adopted it. This policy is exemplified by Xerox Corp., which delivers its 820 line with a standard CP/M system. On the first day of this offer, Wordstar, a popular word processing system, became available on the most advanced 8-bit machine of the moment.

Xerox emphasized the professional aspect of the desktop or personal computer. The auxiliary storage was more varied, including an 8-in. floppy disk arrangement with 1M-byte storage capacity.

Another advanced feature is the provision of full-screen capacity, allowing presentation of 24 lines by 80 char., equivalent to that of big systems terminals.

Finally, Xerox emphasized standard communications facilities, recognizing the emergence of the workstation concept that will require links to other computers.

Second Tier Emerges

While the struggle for market positioning was going on in the $500 to $5,000 price range, a second tier of microcomputer-based vendors was emerging. These manufacturers aimed their product line toward the more extended business needs of the marketplace by meeting the need for a much larger storage capacity and for simultaneously operating terminals.

Hence, the systems departed from a personal computer image to a true small business system. Good examples of such suppliers are Vector Graphic, Inc., Altos Computer Systems, Inc. and Cado Systems Corp.

This hardware advance is exemplified by the Altos ACS8000 offer of a 208K-byte memory system with hard disk capacity of up to 40M bytes, operating CP/M and the multiuser version of CP/M called MP/M.

Independently emerging was the micro-based business applications software offered by Retail Sciences, Inc. and dubbed Peachtree. The Peachtree line-up includes general ledger, accounts receivable, accounts payable, inventory management, order entry, payroll and sales analysis. This software is based on CP/M and MBasic so that almost the entire world of microhardware can be embraced.

The break with 8-bit desktop computers came in 1981, when IBM offered its entry-level product based on the 16-bit processor but retaining the 8-bit data transfer capability. This offering gave the appearance of a superprofessional tool — promising a compromise between a new operating system (IBM DOS) and the option of a CP/M variant, CP/M-86, suitable for 16-bit machines.

The memory of the IBM Personal Computer is now expandable to 256K bytes, and the keyboard is a more complex input and control device. A combination of software systems, such as Pascal, and hardware features for graphics and audio, enhanced the hardware's capability to provide a more complex and sophisticated workstation, including color at the screen. The popular Peachtree business systems became an official IBM offering, as did Visicalc and the Easywriter word processing system.

The key revolutionary step taken by IBM was the application of the lessons already learned elsewhere: Let the hardware fit the software. IBM turned to its own advantage the very technique used against it in the big-computer marketplace, where competitors leveraged IBM-based software with their own compatible

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Dominance in the Microcomputer Marketplace

equipment.

A full 16-bit processor with a 16-bit data transfer bus is exemplified by the Altos ACS8600 line, an outgrowth of its comparable 8-bit ACS8000 offering.

Now we see the transition of 8-bit software technology reflected by the multiuser operating system of Digital Research's MP/M-86II in a head-on clash with the emerging Xenix operating system of Microsoft.

Xenix is a Bell Laboratories Unix-derived system bringing the large microcomputer technology down to the microprocessor.

Another Advance

Another advance reflected in the Altos system is the potential of extending the memory to 1M byte, with up to 80M bytes of hard disk storage.

This system, capable of supporting eight terminals in a multiprocessing, multitasking environment, lays the groundwork for solving complex business problems.

Finally, we reach the current state-of-the-art through the offering of Convergent Technologies, Inc.'s cluster configurations of workstations.

This approach to modularity in intelligent workstations, shared peripherals and networking affords the user big-computer sophistication and power at microcomputer prices.

With a proprietary operating system, Ctos, and the future availability of Xenix, we have the balance of capability providing environments for both transaction-based applications execution and applications software development.

The networking and communications facility allows for integrating workstation functions with companion workstations as well as more remote mainframes or other clustered systems.

The video capability and appearance is outstanding, providing a new level of achievement with a 34-char. by 132-char. position display with each character formed from a 10 by 15 pixel raster.

The extremely fast pace of microcomputer evolution has been immensely assisted by the rapid achievement of de facto standards in both hardware and software.

Underlying this progression was the initial widespread popularity of certain chips, such as Intel Corp.'s 8080 and Zilog, Inc.'s Z80.

Uniformity of interfaces was immeasurably helped by the standards set by certain bus structures, such as the S-100 and Intel's Multibus.

Communications were then effectively standardized by the line conventions of the RS-232C serial connection and the standards set by IEEE 488.

Software achievements were equal to the hardware advances in adopting standards for operating systems and languages.

Because of widespread marketplace presence, even end-user products, such as Visicalc, are leading to de facto standards such as file format conventions.

This will make it easier for applications software to bridge physical gaps of hardware and logical gaps of software.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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LETTERS

DPers as Ogres?

I recently joined the DP department of Idaho Frozen Foods as a data entry operator. Being relatively new to the world of computers, in my spare time I read *Computerworld* and other DP-related magazines our office receives.

Since I started reading these magazines, I have begun to feel that I should be immediately rushed off to a lunatic asylum. In each and every one of these magazines, I find articles on how DP managers are all extremely antisocial, unpleasant and downright nasty human beings. In fact, an article I read recently said that they are prone to alcoholism, divorce and who knows what else.

I have also read several articles on the people who work in DP departments. They, too, are portrayed as unstable, unsociable, high-strung and in need of immediate psychiatric care (so these articles would have us believe). I really never knew that I was in such a state.

May I say that the manager of our department does not seem to have any of the traits described in the various publications? He is pleasant, sociable and seems to get along with everybody, including — though this may be hard for some to believe — the people with whom he works.

Our department even goes camping together every summer. Is this unusual? Are we freaks of nature? Is it really possible for DP people to get along?

What I'd really like to see, if I am to continue to read such publications, are more positive articles about DPers.

I'm sure that just as there are minority races, there are minorities within the DP profession who may be somewhat strange. But I defy you to give me an example of any department in a large, or even a small, organization that doesn't have its share of "different" people.

Please, let me feel normal again. Print some articles that tell me that DPers are really nice people and not the ogres you seem to enjoy portraying.

Bonnie Rock
Data Entry Operator
Idaho Frozen Foods
Twin Falls, Idaho

Ergonomics

I am writing about my pet peeve: the placement of the control key on most general-purpose terminals.

The logical place for the control key is immediately left of the "A" key. Only then can a user hold the control key down and simultaneously press a letter key under the left hand without impossible contortions.

Most terminals put the control key to the left of the shift-lock key, which is to the left of A. I have asked representatives of many terminal makers why this is so. Their invariable response is: "The shift-lock key must be next to A because that is where it is on typewriters and that is where typists are used to finding it."

There is a fallacy in that argument. The shift-lock key doesn't have to be held down while another key is pressed — the control key does.

If the shift-lock key is moved away from its favored position, some users will have difficulty with it until they acclimate themselves to the change. But if the control key is denied that position, *all* users will have difficulty with it unless they can somehow change the shape of their hands.

In this time of rising concern for ergonomics, I am astonished that no one has yet called for standards to determine a sensible location for the control key.

There are other reasonable designs besides one control key to the left of A. Just as a terminal has two shift keys, it could have two control keys — the second one to the right of the space bar.

If this second control key were provided, the first one might be moved to the left of the space bar. To date, I have not encountered a single terminal that uses such a design.

Are there others who think as I do or am I alone?

Jonathan Sachs
Richmond, Calif.

Difficulty of Designing

I found the following statement in Gary Rosensteel's In Depth article "Documentation: You Can Pay Now or Pay Later" [CW, April 12] misleading: "The system specification is one of the easiest documents to prepare, because a major portion of its content is lifted directly from the functional specification."

Rosensteel has forgotten the difficulty of designing the entity — deciding which components and programs are needed and how they interact.

This high-level design activity can be very difficult, especially as the entity of concern becomes more complex.

Bill Neugent
Systems Development Corp.
McLean, Va.

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'Looks Like Another Missed Deadline.'

HHS Benchmark Generator

DPer Wins Award for Canceled Project

By Lois Paul
CW Staff

WASHINGTON, D.C. — Sometimes you win one and sometimes you lose one, but sometimes the game gets canceled.

The latter has been the experience of the Office of Data Processing's (ODP) Special Projects Group for the Department of Health and Human Services. Recently, computer specialist Bill Tuegel received a cash award for saving ODP $15,000 by conceiving, designing, developing and implementing a benchmark program generator on his own time. The problem is that the planned hardware upgrade for which the benchmark program generator was designed has been shelved since August 1981. The development of the generator, Tuegel's Automated Routine for Generating Equipment Tests (Target), grew out of the department's effort in late 1980 to replace its current IBM 370/168 system.

David Bernheisel, chief of the Special Projects Group, said they were at the stage when they were ready to put together benchmark programs to use as a procurement evaluation tool and, "like with all projects of this type, we were tight for time." The solution seemed simple: buy a $15,000 benchmark generator package.

However, Tuegel suggested, "How about if you put off the decision for a while and I will go ahead and put this together on my own time."

Tuegel used his accumulated "use or lose" time, as well as nights and weekends, and within about two months developed Target, a batch program written in Cobol, Bernheisel recalled. The program was up and running by January 1981.

"It generally worked fine, but the environment kind of fell apart on us," Bernheisel said. Armed with Target, he put together a request for proposal (RFP) and ran it through his department's policy group and then obtained the necessary approval from the General Services Administration. He was ready to give it to his procurement group when "the policy group yanked the rug out from under us in August 1981."

Reportedly there is some question about the department's plans for its computer center and this is what is causing the delay. The irony is that other government departments such as Pension Benefits, the Veteran's Administration and the Department of Education have expressed interest in Target and may get to use it before its originators do.

Program Cluster

In his development of Target, Tuegel set up a cluster of 100 programs that would be representative of 140,000 programs run by the Special Projects Group, in terms of resource utilization. The resource requirements from these 100 programs were fed into Target, which generated 100 programs that would be used to quantify the resources. When these are compiled, they form the benchmark, Bernheisel explained. Target also was used to generate 197 input files for the 100 the benchmark programs needed.

At this point, both object programs and load modules were run to determine resource consumption, he continued. Based on these results, the department intended to decide the size of the machine they needed. Instead of having to specify in RFPs the memory, processor speed and channel characteristics they required, Bernheisel's group could use Target to test how each machine, in a given time frame (generally one hour), could handle between 101 and 202 programs, he explained. From these results they could gauge how much processing power each machine had with regard to their particular types of programs.

First-Time DEC Users Get 'ADE'

MAYNARD, Mass. — A software package intended to enable first-time computer users to develop small applications for office and business environments has been announced by Digital Equipment Corp. for use on its VAX/VMS systems and PDP-11 systems running under RSTS/E.

The Application Development Environment (ADE) package reportedly requires no knowledge of programming languages or techniques and uses English words to instruct the system. According to the vendor, users can create their own data bases; add, change or delete data; perform basic arithmetic; produce simple bar graphs; and assemble and print reports. ADE includes prompts for users and extensive HELP messages.

Intended for use with small, frequently changed data bases, ADE is said to allow nonprogrammers to develop applications such as project management, personnel records, parts/products order status, equipment problem reports, budgeting, simple financial forecasting and modeling, salary planning and administration and mailing and telephone lists.

The ADE package reportedly is customer-installable and will be delivered with 90-day warranty support provided by DEC's Telephone Support Centers.

The single-use license fee for the VAX-11 version of ADE is $4,500; for the PDP-11 RSTS/E version, the fee is $3,500. Deliveries are scheduled to begin in May for RSTS/E and in June for VAX systems, the vendor said.

DEC is headquartered in Maynard, Mass. 01754.

'SAS,' 'ETS' Fit IBM DOS/VSE

CARY, N.C. — SAS Institute, Inc. has announced the availability of versions of its Statistical Analysis System (SAS) and SAS Econometrics and Time-series Library (ETS) packages for IBM DOS/VSE systems.

Under DOS/VSE, SAS products run in batch and interactively under IBM's Interactive Computing and Control Facility, the vendor noted. They support IBM and plug-compatible mainframes running VSE Release 2.0 or above.

DOS installations now can use the data management, statistical analysis and reporting tools in SAS or combine these with SAS/ETS for econometric modeling, financial reporting and forecasting.

For corporate customers, the DOS/VSE versions of SAS and SAS/ETS are available for $5,000 for the first year and $2,500 for additional years. Current SAS customers can obtain the DOS/VSE versions of the packages for $4,000 for the first year and $2,500 for succeeding years, the vendor said.

SAS Institute is located at SAS Circle, Box 8000, Cary, N.C. 27511.

Abend-AID, an OS and DOS Operating System Enhancement, transfers the manual, error-prone task of analyzing program abends from the programmer to the computer. Abend-AID tells what happened, where and why it happened in brief English text that eliminates the need for hexadecimal calculations. Abend-AID is language independent, and works for old and new programs in a test or production environment.

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IBM Adds Packages for Cbas Line

WHITE PLAINS, N.Y. — IBM has added packages for vacation and holiday club, installment loan and commercial loan accounting to its Commercial Bank Application System (Cbas).

This software is intended for users of its Customer Information Facility/Virtual Storage program product on IBM 370 systems supported by DOS/VSE.

The club accounting package (Cbas CLB) is designed to permit bank customers to make payments to their club accounts through a variety of payment plans, including automatic transfers from their interest-bearing Demand Deposit Accounting (DDA) accounts, a spokesman said.

The installment loan accounting package (Cbas ILN) reportedly enables customers to automatically pay discounted or simple-interest loans directly from their DDA accounts. The commercial loan accounting package (Cbas CML) is said to support variable payment schedules for loans made by commercial institutions.

The initial license fee for Cbas CLB is $540, with subsequent monthly charges of $180. Cbas ILN has an initial license fee of $855 plus monthly charges of $285. Cbas CML has an initial license fee of $1,410 and subsequent monthly charges are $470.

The three packages will be available in December. The Cbas Base Product Support package is a prerequisite for all Cbas applications, according to IBM. Its monthly license fee is $475.

IBM is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

Menus, Prompts Enhance ADS

NORTH BRUNSWICK, N.J. — Gary Bergman Associates, Inc. has added menus and prompts to its Advanced Debugging System (ADS) for users of IBM and plug-compatible mainframes running under DOS and OS operating systems in a CICS environment.

ADS is described as an interactive, language-independent test facility designed to enable users to identify, diagnose and resolve application program problems in a CICS environment. Release 6.0 of the product reportedly provides access to its capabilities through a set of menus that prompt the user through the various options. In addition, the software now allows Cobol programmers to reference storage areas by data names and statement line numbers.

The vendor noted that ADS can, upon request, intercept processing to prevent storage violations and detect program check errors on either a systemwide or selective basis. Its monitoring components are said to insure the integrity of the system and allow the programmer to control the execution of an application from designated terminals by transaction, selected programs, individual subroutines or instruction by instruction.

ADS reportedly supports all versions and releases of IBM's CICS. After a free trial period, a perpetual license is available for $14,900 (DOS version) or $19,900 (OS version). Month-to-month rental fees are $660 (DOS) or $770 (OS), the vendor said from 14 Hickory Lane, North Brunswick, N.J. 08902.

DG Gets Update For Text Editor

NEW YORK — Version 2.0 of Scred, a screen-oriented text editor for Data General Corp. computers, has been released by Rational Data Systems here.

The software reportedly runs on all DG disk-based operating systems, including Rdos, DOS, AOS, AOS/VS and MP/OS. It does not require a separate terminal because it reportedly can be used with any CRT terminal that supports cursor addressing and scrolling. Scred can be configured to utilize "intelligent" features of the terminal on which it is used, such as "delete character" or "insert line," according to a spokesman.

The price for Scred on DG Rdos, DOS or MP/OS systems is set at $950; the DG AOS and AOS/VS version costs $1,200.

In a simultaneous announcement, Rational Data Systems announced price increases, effective May 1, for all system software products for DG systems.

The company is headquartered at 205 E. 42nd St., New York, N.Y. 10017.

'Infograf' Generates Business Graphs

WORTHINGTON, Ohio — Infograf, a software package for generating business graphs and charts, has been developed by Graphics Concepts, Inc.

Infograf is said to be both device- and host-independent and is currently implemented on the Prime Computer, Inc. 50 series. It reportedly is capable of driving more than 30 different devices, including monochromatic and color CRTs, plotters and film recorders.

Infograf is also interfaced with Henco, Inc.'s Info interactive relational data base management package.

Prices for Infograf range from $12,000 to $30,000 for a 25-year license, installation, two device drivers, a manual, year of maintenance and update. Additional device drivers cost from $500 to $3,000.

Graphics Concepts is located at Suite 350, 6797 N. High St., Worthington, Ohio 43085.

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Utility Packages Designed for HP 3000

BUFFALO, N.Y. — A group of utility packages made to run on Hewlett-Packard Co.'s HP 3000 is available from Bradmark Computer Systems, Inc.

The packages are said to include DBCopy II, DBIsam utility and DB-Key-Change.

DBCopy II is a general data base copy utility to supplement and enhance the capabilities of the present HP 3000 Image data base management system, the vendor said. It can run from a terminal or be processed through a job stream. Users can copy an entire data base, select data sets within a data base, select entries within a data set or select items within an entry.

The DBIsam utility can integrate sequential processing functions of indexed file management with those of Image, the vendor said. Files can be processed sequentially without external programming and the user can support up to 10 unique and generic indexes on any data set within the data base.

DB-Key-Change is a general-purpose data base maintenance utility that can assist the HP 3000 Image user in performing key change operations, according to the vendor.

One-time license fees are $1,500 for DBCopy II, $2,500 for DBIsam and $750 for DB-Key-Change. The fee for all three products is $3,500.

Bradmark Computer Systems is located at 4446 Main St., Buffalo, N.Y. 14226.

JES Writer Runs on IBM 370s

DALLAS — Information Concepts, Inc. (ICI) has announced an IBM Job Entry Subsystem (JES) writer for IBM 3270 series terminals and 3280 series printers, which is said to run on any IBM 370 and plug-compatible mainframe under the MVS operating system with JES Release 2 or 3.

Called the JES Vtam Interface (JVI), the package reportedly is a standalone Vtam application for MVS/JES2 and MVS/JES3, similar to standard remote job entry facilities. It initiates two-way communications with JES as it requests print output, which it brackets with the proper protocol for bisynchronous devices.

The vendor explained that JES, when connected to the JVI, can directly access any IBM 3200 series printer running under Vtam or Tcam with an APL interface. The printers are shared with other applications such as IBM's CICS and IMS.

Among its features, JVI includes modules to communicate with JES, to build Vtam buffers and the appropriate print control and to produce IBM System Management Facilities-type records, the vendor said.

Price for JES is $7,500. Annual maintenance is 15% of the purchase price. ICI also offers a free 30-day trial.

ICI is located at P.O. Box 18658, Dallas, Texas 75218.

Billing Tool Fits IBM 5280

AUCKLAND, New Zealand — The Advanced Distributors System (ADS), a billing, accounts receivable, inventory control and sales analysis for IBM's 5280 small business systems, was announced here by Martin Spencer & Associates Ltd.

ADS reportedly can also be used in a distributed environment, capturing data for transmission to an IBM System/34, System/38 or mainframe.

Use of the ADS package requires purchase of the vendor's Job Stream Supervisor operating system, which is available for $560. The ADS software package itself — which includes billing, accounts receivable, sales analysis and inventory control — is available for $3,000.

The vendor is located at the National Mutual Centre, Shortland St., Auckland 1, New Zealand.

T/S Service Aids Order Processing

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) has announced the availability of a time-sharing service called Dispatch 1000, which was designed to facilitate order processing, inventory control, accounts receivable management and management reporting.

The company's Marklink terminals are installed at user sites to access the Dispatch 1000 on a time-sharing basis. Dispatch reportedly runs on Geisco's teleprocessing network.

The initial implementation cost of the system, including complete customization, but not including the Marklink terminals, is $50,000, according to the vendor.

More information can be obtained from Geisco, 401 N. Washington St., Rockville, Md. 20850.

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PERKIN-ELMER

Eliminates User Exit Routines

CA-Earl Updated for DL/1, IMS

JERICHO, N.Y. — Release 3.2 of CA-Earl, Computer Associates International, Inc.'s report generator package, is said to allow access to IBM DL/1 and IMS data bases in a simplified manner.

CA-Earl is available for IBM and plug-compatible mainframes operating under DOS/VS(E), OS/VS1, MVS and CMS.

The vendor explained that user exit routines no longer are required with Release 3.2, and therefore fewer statements are needed to define DL/1 and IMS data bases. Vsam files reportedly can be processed the same way.

In addition, CA-Earl users now have available vendor-supplied user exit routines for access to Cincom Systems, Inc/s Total, Cullinane Database Systems, Inc.'s IDMS and Software AG's Adabas data base management systems, the vendor said.

A CA-Earl program now can be compiled and link edited to a user-load library or core-image library, according to Computer Associates. The program then can be executed directly without having to recompile, the vendor added.

CA-Earl is priced at $8,800 for a DOS version and $10,500 for OS and CMS versions for a three-year lease, the vendor said from 125 Jericho Tnpk., Jericho, N.Y. 11753.

Unigraphics Interface Out

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) and Manufacturing Data Systems, Inc. (MDSI) have made available an interface between McAuto's Unigraphics computer-aided design and manufacturing (CAD/CAM) software and MDSI's Compact II parts programming package.

The interface, offered at no charge to Unigraphics customers, allows companies that have been using Compact II to acquire the three-dimensional interactive graphics system and still produce part programs compatible with their exisitng libraries of numerical-control machining instructions, the vendors explained.

The interface reportedly can be used on the single-terminal Unigraphics configuration autodesign station ADS-100. Base priced at $90,000, the ADS-100 provides the design and manufacturing capabilities of the multiterminal Unigraphics system, the DDS-100.

Compact II, MDSI's proprietary numerical control part-programming language is available through a worldwide time-sharing network or on a variety of in-house minicomputer-based systems, the vendor said.

McAuto can be reached through P.O. Box 516, St. Louis, Mo. 63166.

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Mark IV Manual Available

HOUSTON — An *Independent Study Manual* designed to provide an individual with a thorough knowledge of basic and advanced functions of Informatics, Inc.'s Mark IV software has been released here by Computer Assistance, Inc.

The text contains step-by-step instructions, several illustrations and detailed case studies. It can also be used in workshop environments with minimal support, the publisher claimed.

The manual's 1,200 pages and 18 sections are divided into two volumes. Volume I consists of Introduction and Basic Mark IV. Volume II contains Advanced Mark IV and applied Mark IV's advanced functions to diverse DP problems. The combined set costs $1,400 and is updated for $100/year, according to Computer Assistance, Suite 185, 7670 Woodway, Houston, Texas 77063.

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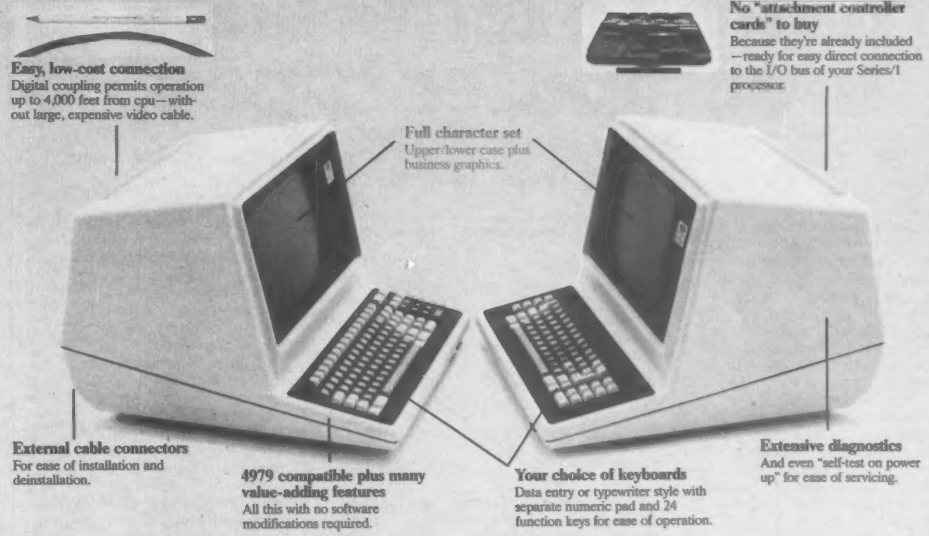
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Enhanced Mass Storage Package Offers I/O Driver, Fits PDP-11

STATE COLLEGE, Pa. — An enhanced mass storage package developed by Trimarchi & Associates, Inc., for software packages running on Digital Equipment Corp. PDP-11, is available from Interactive Microware, Inc.

Hyperdrive (HD) has an I/O driver that treats random-access memory (RAM) as one to eight pseudodisk drives under either DEC's RT-11 or S&H Computer Systems, Inc.'s TSX-Plus operating systems, according to the vendor.

Via SET commands, a user-specified block of memory is assigned to each pseudodisk, the vendor said, which the user can initialize, copy to or from, or use as a hard disk and onto which the user can reportedly list a directory.

HD uses from 64K-bytes to 256K bytes of RAM in 18-bit address systems and supports up to 4M bytes of RAM on a 22-bit address bus, the vendor said. HD is available on floppy disk or tape for $495 with documented source code supplied.

Interactive Microware is located at P.O. Box 771, Department HD, State College, Pa. 16801.

M2C Release 2 Offered for PL/I

WABAN, Mass. — Tanit Software Services Co. has announced the second release of its conversion package, M2C, which converts CICS macro-level programs to command-level programs.

The package is available for IBM and plug-compatible systems running under DOS and OS operating systems, the vendor said.

The second release of M2C was designed specifically for PL/I code. The original version was designed for Cobol code, the vendor said.

The vendor claims programmers can save up to 60% of manual conversion time by using the package. The package costs $6,500 for a one-year lease, which includes the source language, a reference manual and installation. The firm is also offering offsite conversion packages for $750/program from the vendor through P.O. Box 191 Waban, Mass. 02168.

Software Service Bows for System/38

INDIANAPOLIS — A software service for IBM System/38 users, which includes an integrated set of programs for the wholesale and retail distribution industry, was announced here by Data Processing Services, Inc. (DPS).

The software reportedly includes integrated modules consisting of billing, inventory, accounts receivable, sales analysis, purchasing and retail inventory control. The software for the wholesale industry costs $40,000 and the package for the retail distributors sells for $20,000, the vendor said.

The DPS Services Group consists of 25 systems programmers and analysts and will be available in May, offering a range of education classes, conversion aids, instructional materials and time-sharing services, according to the vendor.

DPS is located at 8604 Allisonville Road, Indianapolis, Ind. 46250.

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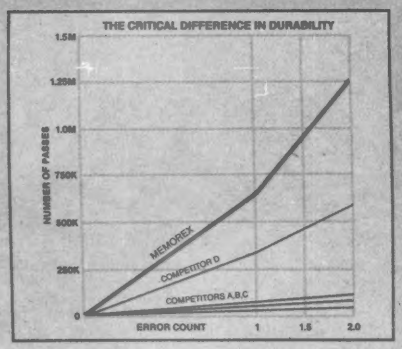

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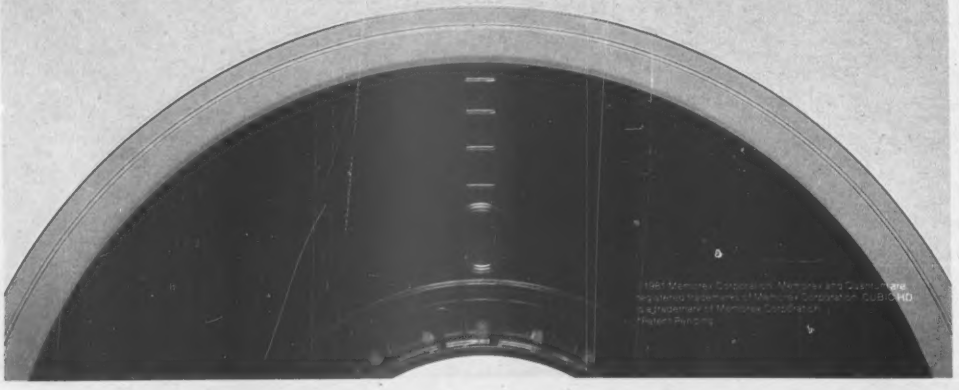

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I.P. Sharp Offers Time Series To APL Time-Sharing Users

ROCHESTER, N.Y. — A collection of 4,500 monthly, quarterly and annual U.S. economic time series is available from I.P. Sharp Associates to users of its international APL time-sharing service.

The time series, Citibase, is maintained by the Economics Department of Citibank and draws data from more than 100 U.S. government and privately published sources, according to a spokesman for I.P. sharp.

The Sharp APL service enables users to combine Citibase material with time series of their own as well as to analyze Citibase data with either their own or Sharp's analytical programs, the spokesman said.

Citibase was designed for users in government, finance and industry for analysis, forecasting and planning, according to the spokesman. It is updated daily.

There is no surcharge to current time-sharing customers for accessing the Citibase data base, according to a Sharp spokesman.

Charges for the time-sharing system are $1/hour used, 70 cent/1,000 char. entered or received and 45 cent/CPU unit used, the spokesman said.

I.P. Sharp is located at 1200 First Federal Plaza, Rochester, N.Y. 14614.

'Cash' Available For RPG-II Minis

ELMIRA, N.Y. — Automation Services, Inc. has released a version of its software package for the collection agency/collection bureau industry for use on any minicomputer and larger system that supports RPG-II.

The Collection Accounts Superbly Handled (Cash) package originally was developed for the IBM 360/30.

Cash features standard collection accounting functions and employs a multilevel edit scheme to trap errors at several stages in processing, the vendor said.

It is available either as a turnkey hardware/software package on a service bureau basis or as a software package alone. The software costs $5,000 and the turnkey and service bureau pricing depends on collections volume required.

Automation Services is located at 302 E. Church St., Elmira, N.Y. 14901.

'WMS' Offered For IBM Users

MCLEAN, Va. — Johnson Systems has developed a work-load management system (WMS) for use on IBM and plug-compatible systems running under OS/VS1, JES2, SP1, SP2, SP3, SE1 and SE2 operating systems.

The WMS was designed to tie together production control information from Johnson's Automated Planning and Execution Control System (Apex) with the resource management facilities of its Job Acting Report Systems (Jars), the vendor said.

Apex encompasses the management of a System Resource Manager within the total production work flow and Jars extends System Management Facilities (SMF) to the job/step application level, according to the vendor.

WMS was designed to provide a single source of data center management information, combining the planning and execution information from Apex with SMF data from IBM's VSI/VMS operating system into a data base for work-load forecasting, planning and scheduling, according to the vendor.

The WMS is available at a half-price cost of $2,500 until July. The price afterwards will be $5,000.

Johnson Systems is located at 8300 Greensboro Drive, McLean, Va. 22101.

Applications Processor Designed For Minis Running Under Pick

SAN FRANCISCO — Cypher has announced Smartware, an applications processor designed for use on minicomputers running under Richard Pick and Associates' Pick operating system, including the IBM Series/1.

Smartware is intended to enable users to create data bases, an unlimited number of entry screens and reports and menus to control the sequence of events.

It reportedly supports shareable reentrant code and provides for the changing of data base definitions and relationships without the restructuring of files.

The vendor said Smartware can be used in conjunction with mainframe computer data files and that files on magnetic tapes may be selected and certain fields loaded into a Smartware data base.

The data can then be modeled, enriched and updated. Relational capabilities reportedly allow for comparison and integration with other data bases.

Among the hardware running under Pick that Smartware supports is Prime Computer, Inc. systems and Ultimate Corp. minicomputers based on both Digital Equipment Corp. and Honeywell, Inc. CPUs.

The software is available for between $3,500 and $5,000 from Cypher at 121 Second St., San Francisco, Calif. 94105.

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Report Covers Fortran Coding

ESTILL SPRINGS, Tenn. — Associated Technology Co. has introduced a 40-page document that reportedly serves as a standard for programming in Fortran and is written for both experienced and novice programmers.

A DP department would purchase the document to provide a standard set of coding rules for its programmers, a company spokesman said. It provides a methodology for producing top-down programs that are structured, testable and easy to maintain, according to Associated Technology.

The document is available for $10 from Associated Technology, R2 Box 448, Estill Springs, Tenn. 37330.

Contour Package Runs on DI-3000

BOULDER, Colo. — Precision Visuals, Inc. has announced a three-dimensional contouring package for geophysical applications being run on the firm's DI-3000 device-independent graphics system.

The package is a collection of Ansi-66 Fortran IV user-callable subroutines for gridding randomly positioned data and generating contour maps on a variety of display devices, the firm said.

The package reportedly can be used in meteorological studies, land-use planning and mining.

The package costs $3,000, the vendor said from 250 Arapahoe, Boulder, Colo. 80302.

Fixed Asset Aid Fits System/34

OAKLAND, Calif. — A Fixed Asset Accounting software package for use on the IBM System/34 is now available from Herring Associates, Inc. here.

The software runs under the SSP operating system and is written in RPG II. Features of the fixed asset package include general ledger interface, Accelerated Cost Recovery System, standard depreciation methods and separate state and federal depreciation methods, according to a spokesman.

The license fee for this package is $2,000 and includes seven hours on-site installation and customizing, the vendor said from Suite 415, 440 Grand Ave., Oakland, Calif. 94610.

'Run-Tabz' Fits IBM's VSE/Power

OWINGS MILLS, Md. — Zebra Software, Inc. has announced a job accounting package for shops running IBM's VSE/Power program product.

The Zebra program, called Run-Tabz, is aimed at small- to medium-scale users who have moved into a large mainframe capacity on IBM 4300 series processors. It reportedly utilizes existing facilities of Power/VS or VSE.

The package reads, formats and prints data accumulated by the Power accounting file. This file is the same under IBM's DOS/VS and DOS/VSE operating systems, the vendor said.

The package costs $400. The vendor can be reached at Box 441, Owings Mills, Md. 21117.

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Package Helps Financial Firms

CANOGA PARK, Calif. — A software package for financial institutions, corporations and public agencies involved in Deferred Compensation Plan Administration is available on a time-sharing basis from Wismer Associates, Inc.

The Deferred Compensation Plan system reportedly was designed to handle transaction accounting and reporting for individuals investing in a deferred compensation plan that offers multiple investment options. It is an administrative tool for management that offers:

- Investment fund accounting and reporting.
- Determination of investment fund earnings on an accrual basis.
- Data base for collection and maintenance of contributions and disbursements.
- Reports on participant status and investment product status.

The software is available on a time-sharing basis for $1/participant/mo, a spokesman said.

Wismer Associates is located at 22134 Sherman Way, Canoga Park, Calif. 91303.

Software Directory Lists 4,000 Products

POTTSTOWN, Pa. — *The 1982 International Directory of Software*, published by Computing Publications, Inc., has been released here.

The 1,360-page text describes more than 4,000 proprietary software products for mainframes, minicomputers and microprocessors. Systems and applications software are arranged within 107 categories, including communications, compilers, data management, development aids, systems software and utilities. Other categories include accounting, administration, production and distribution, banking, insurance, computer-aided design, modeling, simulation and statistics and various other categories for specialized applications software.

If ordered before June 30, the directory costs $145 plus shipping from Computing Publications, Suite 401, First Federal Building, Pottstown, Pa. 19464.

Micronotes

Six software packages have been introduced by Callan Data Systems for its CD100M integrated workstation. **Calcstar** ($295) is an electronic worksheet package that allows on-line interactive financial forecasting of up to 127 columns and 255 rows. **Wordstar** ($500) and **Mailmerge** ($150) are word processing packages with list merge capability. **Spellstar** ($250), integrated with Wordstar, allows spelling checks against a 20,000 word dictionary. **Datastar** ($350) provides data entry and can perform field verification, auto field repeat and other functions. **Supersort** ($250) allows records to be reordered in alphabetical or numerical order for any number of fields within a record. More information can be obtained by contacting Callan Data Systems, 2637 Townsgate Road, Westlake Village, Calif. 91361.

Micro Five Corp. has announced that its multiuser **Series 3000** computers now support Microcobol Products, Inc.'s **Mbos/5** operating system, and therefore can run programs written in Cobol or the software vendor's Microcobol. The Series 3000 is a 16-bit microprocessor-based business system that can support up to 10 user stations performing multiple tasks. The base price of such a system is $15,500, the vendor said from 17791 Sky Park Circle, Irvine, Calif. 92714.

The sixth edition of ***The Software Vendor Directory*** has been released by Micro-Software Services, Inc., formerly Micro-Serve, Inc. The directory is a research and reference text of indexed listings for more than 1,800 microcomputer software vendors, 123 hardware vendors and 22 operating systems, classified into 300 categories. It is updated every six months.

It comes in a three-ring binder for $57.95 and the optional updates cost $100/year. It is also available on two 8-in., single-sided IBM-standard disks that run under CP/M for $260. Micro-Software can be reached at P.O. Box 482, Nyack, N.Y. 10960.

Sorcim Corp. has added color graphics to its electronic spreadsheet simulator, **Supercalc**, for the IBM Personal Computer. Users with color display monitors will see negative values and diagnostic messages displayed in red and protected formulas displayed in yellow. It is available for $295 from Sorcim, 405 Aldo Ave., Santa Clara, Calif. 95050.

Graph, a graphics package, is now available for the Apple Computer, Inc. Apple II from Software Publishing Corp. It can operate as a stand-alone or can interface directly with the vendor's Personal Filing System data bases or Visicorp's Visicalc to produce bar, line or pie charts. Four graphs can be displayed on a single set of axes, the vendor said. The software is available for $135 from Software Publishing Corp., 1901 Landings Drive, Mountain View, Calif. 94043.

Small Systems Engineering, Inc. has introduced three compilers for Commodore Business Machines, Inc. PET and CBM microcomputers. **Softbox** permits Commodore users to run Digital Research, Inc. CP/M-compatible applications packages and interface with up to four Corvus Systems, Inc. Winchester hard-disk drives. RS-232 interfacing is also included. **Hardbox** will reportedly allow up to 64 users to access simultaneously the same hard disk. Finally, the **Petspeed** compiler allows Commodore Basic programs to run up to 30 times their normal interpretive speed, the vendor said.

The Softbox and Hardbox systems are priced at $895 and $695, respectively. The Petspeed compiler lists for $350 from Small Systems Engineering, 71 Park Lane, Brisbane, Calif. 94005.

License Fee Cut To $950 on DSF

PRINCETON, N.J. — The license fee on the Fortran encryption software, Data Security Facility (DSF), has been marked down to $950 by the Princeton Software Co.

Designed to provide general-purpose encryption capability to virtually any system with a Fortran compiler, Fortran DSF reportedly implements the National Bureau of Standard's Data Encryption Standard algorithm. It is offered on a perpetual source license and includes documentation and maintenance.

The assembler version of DSF was designed for IBM mainframes and compatibles and can encrypt more than 40,000 byte/sec on an IBM 3033, according to the vendor.

Assembler DSF is available on a perpetual license basis for $2,500. The vendor can be reached through P.O. Box 1317, Princeton, N.J. 08540.

Builders Get MAC Upgrade

BEAVERTON, Ore. — An Equipment Cost software system for the construction industry, which runs on Texas Instruments, Inc. minicomputers, has been announced by Timberline Systems, Inc.

As part of the firm's Management Accounting for Construction (MAC) package, Equipment Cost was designed for any user of equipment that is costed out, depreciated and scheduled for maintenance.

The system is said to automatically accumulate costs accrued, revenue attained and miles or hours used for each piece of equipment. It also reportedly captures costs by 15 breakdowns, records downtime, allows for multiple rental rates and records the latest location of equipment.

The system, which communicates with other MAC systems, costs $4,200 for TI DX-10-based systems, a spokesman said from 10550 S.W. Allen Blvd., Beaverton, Ore. 97005.

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SPECIAL REPORT

The Race For People Productivity

Edited by Marcia Blumenthal and Jim Bartimo

April 26, 1982

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Seeking System Productivity?

User-DP Interaction Critical to Design Process

By W.B. Foss
Special to CW‡

Although new methods of programming have proved to be popular attempts at increasing productivity, good communications skills between systems professionals and users are critical to the design process.

The following issues are symptomatic of poor communications between the end user and systems design personnel:

- The user is too busy to contribute to the project.
- Approval of specifications and end products is delayed and sometimes does not happen.
- The user does not understand what the system will do.
- The systems analyst does not understand the needs of the user or the business problem.
- Project budgets are moving targets.
- The user believes that systems take too long to build.

These are only a few of the many problems that project managers face. They add up to two common issues, interpersonal communications and a lack of confidence in the development process by the user.

User Involvement in Projects

A project management seminar developed by Gellman, Hayward & Partners Ltd. brings users and systems people together to discuss their problems and develop solutions to improve their working relationships.

This technique has led to some specific conclusions about how to involve users in systems design projects:

- *Make sure that a user has responsibility for systems acceptance.* If he takes this responsibility seriously, he will work closely with the project manager (system provider) to complete the system. We emphasize that a system is not completed until it is delivered *and* accepted.
- *Design the project to fit the users "attention span."* The longer the user must wait for a system, the more nervous he gets. Depending on his level of confidence in the project team and the trust that has been developed, we have found that a user can wait as long as 18 months or as little as a few weeks.

'A petroleum company developed a personnel system that two departments wanted, but neither group would participate in the project. The systems department made the mistake of taking full responsibility; it later had trouble obtaining user acceptance.'

If a system is large enough to take two years to deliver and the user's attention span is short, the project manager must find a way to divide the system into discrete deliverables, perhaps using prototyping or the release method of software development. Thus, he may plan to deliver a two-year system in six releases — each spaced four months apart.

In this way, the user sees frequent tangible results and, if the deliverables work well, his confidence builds over the life of the project.

- *Design the user into the project.* If the user is involved in the initial shaping of the project, he has an opportunity to be involved in the decision-making process. For example, he may prefer one of three workable designs that are prepared by the systems analyst. Allowing the user to make a choice reinforces his commitment because it then becomes "his" system.
- *Make sure that users are involved in the project organization.* Suggested ways in which a user can become involved are:
  — Participation of senior-level user management in a project steering committee.
  — Participation of middle-level user management in a project working committee.
  — Including the direct-user contact as a member of the project team.
- *Focus on end-product definitions.* With a well-described functional specification, the user can visualize what the system will do for him. If he can actually see what the system will do at an early stage, perhaps through a prototype demonstration, his confidence will increase. Software development is too often a technical abstraction that the user has difficulty understanding.
- *Encourage the user to develop acceptance criteria and acceptance specifications.* This can be done at the same time the functional specification is prepared. It serves to provide a measure for the user and increases his involvement in the development process.

Involve All Levels

By using these methods, the project manager has an opportunity to design the project so the key decision makers in the user area are participating properly. This in turn tends to increase the commitment of the user community at several levels of management. It also forces communication among the user managers so that they agree on the nature of the system and the results that are expected from it.

It has been observed by many that productivity improvements of an order of magnitude are frequent when individuals feel committed to them. The more committed he is, the better job he does. The high commitment level results from well-designed roles where each individual in the team effort has a share of the responsibility.

Responsibility is delegated in such a way that team members have the freedom to be creative and have control over the resources they need.

In addition, a project manager will obtain more productivity from his team members if they believe that the user is committed to the acceptance process and is sharing the completion responsibility equally. When systems people believe that all the responsibility is their own, morale suffers and productivity falls.

In one case, a petroleum company developed a personnel system that two departments wanted, but neither group would participate in the project. The systems department made the mistake of taking full responsibility; it later had trouble obtaining user acceptance.

The company learned from this experience. By examining other projects that were successful, it found new ways of obtaining user involvement and measuring results. As a result, productivity improved.

Systems productivity these days is not as much a technical problem as it is a human relations issue. Dramatic improvements occur when effective working relationships are put in place. While software productivity aids and better design methods help, it is cooperation among the human participants that makes real strides in productivity possible.

Foss is a partner in the consulting firm of Gellman, Hayward & Partners Ltd., which is located in Calgary, Alta., Canada.

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Risks Real When Analyst's Role Eliminated

By Gordon B. Davis
Special to CW‡

User-developed information system applications are good news, but they are also potentially bad news. Serious organizational risks can arise from eliminating the role of the analyst in the development/implementation process. However, an organization can achieve the benefits from user-developed systems while reducing dangers from errors in these systems by the adoption of appropriate policies.

A user-developed system differs from traditional development procedures by eliminating the key role of the analyst as the elicitor of requirements, analyzer of needs, supervisor of development and enforcer of organizational standards (Figure 1). The tools for user development are designed for nontechnical personnel, whereas analyst development tools may require technical expertise.

The concern here is that the user-developed system moves along with little or no analyst participation.

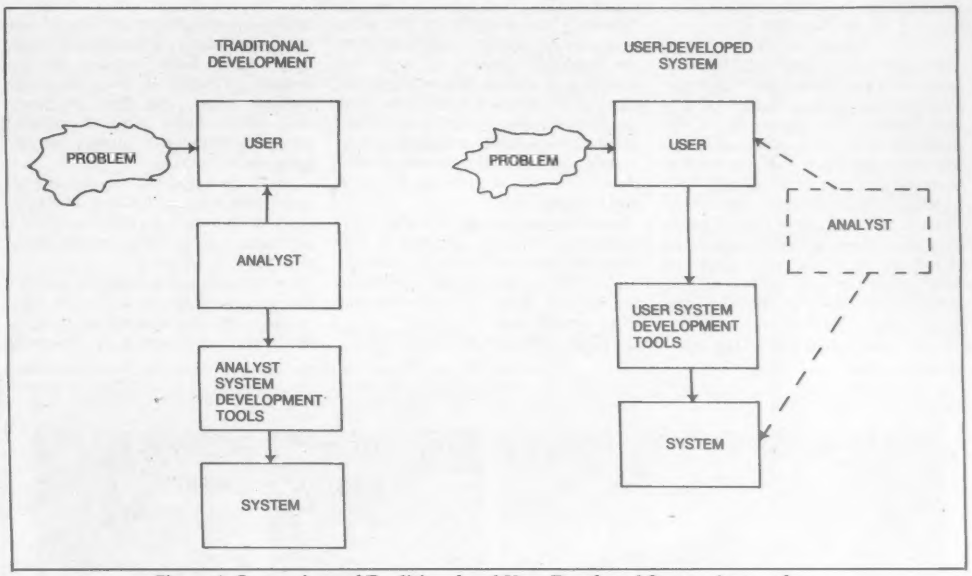


Figure 1: Comparison of Traditional and User-Developed System Approaches

Three Advantages

On the other hand there are three advantages to having users develop their own decision support systems:

- Relieves shortage of system development personnel.
- Eliminates information requirements determination by information system personnel. Having users develop their own systems does not eliminate the problem of obtaining requirements, but it places an "insider" in the role of requirements problem solver.
- Transfers the information system implementation process to users. Poor implementation is one of the major reasons systems are not utilized. Users may develop less sophisticated systems when they do the system and development, but they will use them.

These advantages of user-developed systems are impressive. However, there are serious risks in the elimination of the analyst's role as a developer.

These risks and suggested ways of minimizing risk, as described below, are summarized in Figure 2.

The first risk results from eliminating the separation of the user and analyst functions.

Information systems must meet organizational objectives and be at a level of quality and completeness that is appropriate to the organizational unit and decision-making activity. In this regard the analyst serves three purposes:

- A technical expert in system design and development. Technical expertise has been important with traditional development techniques.
- An independent reviewer of requirements. User needs are questioned and alternatives suggested and discussed. System documentation is improved because two different functions use the documentation.
- An enforcer of acceptable standards and practices. Users may not perceive the need for the standards, but the analyst can better understand their value and is therefore an appropriate person to be given the role of system standards enforcer. Standards and practices include documentation, controls, testing and interfaces with other systems.

Another risk arises from the frequently observed difficulty users have identifying a correct and complete set of requirements. This stems from the following:

- Human cognitive limits. Human information has a significant bias toward requirements based on current procedures, currently available information, recent events and inferences from small samples of events.
- Errors in requirements determination processes. Users may not adequately perform system requirements tasks. There may be several possible errors in the process and outcome, including overanalysis and inefficient search, solving the wrong problem and applying the wrong analysis or model.

There are risks from user-developed systems caused by a lack of user knowledge and acceptance or organizational quality assurance procedures. These risks occur from a reluctance to apply adequate procedures for the following:

- Testing. Testing is a difficult and time-consuming process. Users are likely to ignore the range of testing that is desirable because of overconfidence in their system and overconfidence in simple, cursory testing.
- Documentation. Documentation is important in quality assurance procedures such as reviews. It is also important to future modification. Yet, the tendency is to avoid documentation. User development software should enforce necessary documentation, but many user languages do not.
- Validation and other programmed assurance processes. Certain quality assurance procedures need to be built into programs. All input data should be validated and echoed back to the person doing the input. There should be record counts, control counts, crossfooting tests, tests for reasonableness and so forth. Many users have little understanding of such controls.
- Audit trails. Users will frequently omit audit trails because they do not appreciate the need for them.
- Operating controls. Users without data processing experience may not understand the need for and value of operating controls to assure completeness of processing.

Cause of Danger and Risk	Method for Minimizing Risks
1. Elimination of separation of the functions of user and analyst.	Provide analysts as advisers and reviewers.
	Have organizational policies that user-developed systems must be appropriately reviewed and documented.
2. Limits on user ability to identify correct and complete requirements.	Provide user training in problem finding, problem formulation and requirements analysis.
	Provide ongoing training feedback through review by analysts and other reviewers such as auditors.
3. Lack of user knowledge and acceptance of application quality assurance procedures for development and operation.	Provide user training in application quality assurance and controls.
	Include quality assurance and control and documentation in development system procedures.
	Provide ongoing training feedback through analyst and auditor review.
4. Unstable systems in organizations that need stable systems.	Provide user motivation for and training in stable systems.
	Review of user system affecting organizational stability.
5. Encouraging private information systems in an organization.	Have an enforced organizational policy on review and documentation to allow system transfer to new user.

Figure 2: Dangers and Risks and Methods for Minimizing Risks

Need for Stability

Most organizational processes depend on stable systems. There are, of course, rigidities inherent in stable systems. It has been suggested by some researchers that task interdependency is a key variable in deciding on the appropriateness of personal computing. Independent tasks in which the manager reaches a decision through private analysis are appropriate, but pooled or sequential interdependent tasks are not suitable for personal computing because of the need for stable interfaces that apply to all components of the organization.

One objective on computer-based information systems is the expansion of the scope of the formal public system to include information otherwise contained only in private systems. But user-developed systems will tend to expand the scope of private information systems.

The following suggestions for methods to minimize risk should not inhibit experimentation with user-developed systems. Rather, they provide mechanisms for organizational controls to assure that user-developed systems will be appropriate for

(Continued on SR/4)

Exec: Watch Out for Self-Professed Wise Men

By Ken Orr
Special to CW‡

It is one of the ironies of life that those who are in the worst condition also are the most subject to frauds and fakeries. The incurably ill, the destitute and the oppressed are, therefore, the most likely to believe in magical cures or solutions. This happens in part because these unfortunates have so little that a magic cure gives them something in which to believe. And wherever there is a willingness to believe in magic, there will be others to sell it — especially if there is a buck to be made.

Today, many data processing organizations are roughly in the same shape as the patient suffering from an incurable disease — they are grasping at straws. These organizations know they are in trouble, their productivity is low, their systems unreliable, expensive and difficult to maintain, their staff overworked and their backlogs are growing by leaps and bounds.

Into this environment come self-professed wise men pointing in different directions. Which way should we go? Who is the quack and who is the doctor? What is snake oil and what is medicine?

In today's DP environment, the current snake oils might be classified as quick and dirty user-oriented tools or packages. Such panaceas are extremely attractive — they offer immediate relief, and they do away with all the major problems of systems development. Sounds almost too good to be true.

But if an organization expects to make even small gains in productivity, it must expect to make large investments in dollars, people and, most importantly, time.

It is all too easy for futurists to foresee improvements of 1,000% in productivity (as one sees in ads for various books or courses). In the real world, however, such gigantic improvements in productivity are sometimes observed (like supernovas) for extremely brief flashes, but invariably these flashes are followed by periods of regression and reduced productivity brought on by reality.

Currently, certain industry-wise men are pushing magical solutions such as information centers, nonprocedural languages, user-developed systems and packaged software.

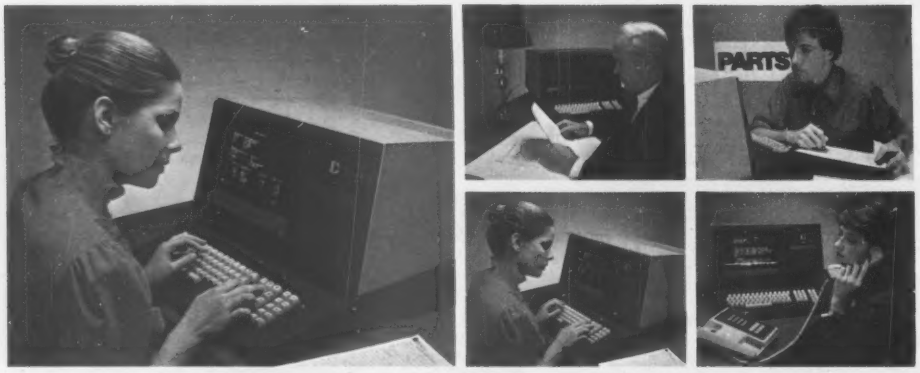
Clearly, such ideas have their place, but there is no evidence that the introduction of these ideas will suddenly cure the productivity crisis faced by those involved in information systems development.

Like most powerful ideas, these must be approached with extreme caution. Otherwise, they can cause more harm than good.

Given this situation, data processing management is in a difficult position. On the one hand, they have a set of rather old-fashioned, undertrained, overworked employees trying to explain why top management's favorite project cannot be undertaken. On the other hand, they have "experts" in tailored suits painting glowing pictures of how good things will be if they only employ some particular brand of magic.

As always, the truth lies somewhere in between, but unfortunately nearer to the old-fashioned systems folk than to the futurists. Productivity gains, if they occur at all, are nearly always the result of hard work and planning.

It is simply not true, as hardware and software futurists (vendors, for



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SYSTEMS THAT WORK TOGETHER NOW

Analyst Absence Seen Risk Factor

(Continued from SR/3)

incorporation into the organizational system:

- Provide analysts as advisors and reviewers for user-developed systems.
- Have organizational policy that user-developed systems must be appropriately reviewed (by analysts or others). Provide walk-through for important systems.
- Have organizational policy that user-developed systems must be appropriately documented. Include automatic documentation procedures and controls.
- Provide user training in problem finding, problem formulation and requirements analysis.
- Provide ongoing training feedback through review (by analysts, auditors and others) for design, requirements, quality, controls and stability.
- Provide user training in application quality assurance in the development system. Include quality assurance procedures in the user developed system.
- Provide user motivation for and training in stable systems.

Davis is the Honeywell professor of management information systems at the School of Management, University of Minnesota.

Offering Cure-Alls for Systems Development

instance) would have you believe, that by throwing open the doors to information centers, nonprocedural languages, user-developed systems and packaged software the organization will be freed from the necessity of doing the hard, dirty and expensive jobs of planning, requirements definition and development.

In fact, just the opposite is true. Those organizations that stand to make the most of the opportunities posed by the latest technologies are precisely those that already have their act together. And, not surprisingly, these organizations also are the least apt to be tempted.

Because information systems are both important and threatening, most top managers would like to believe that everything concerned with implementing magic will be easy. But of course it won't be.

In the real world, information centers will cause massive increases in computer costs, nonprocedural languages will be used in areas for which they were not designed and cause major problems, user-developed systems will produce erroneous results initially and "orphan" systems later when they are abandoned and packaged software will often cost more to modify and install than it did to purchase in the first place.

Good judgment, it has been said, is the result of experience, and experience is usually the result of bad judgment. It is unfortunate that most people, managers included, have to be burned a few times before they become appropriately wary.

Americans are given to quick fixes. This has worked reasonably well in the past, but in the last few years we have come up against international competitors who look more to the long run and developing long-range plans. And their productivity gains far outstrip our own.

Lesson for DP

There is a lesson here for data processing. If true productivity gains are to be introduced in the development of information systems, then we have to understand our long-range goals, our options and how we intend to achieve them.

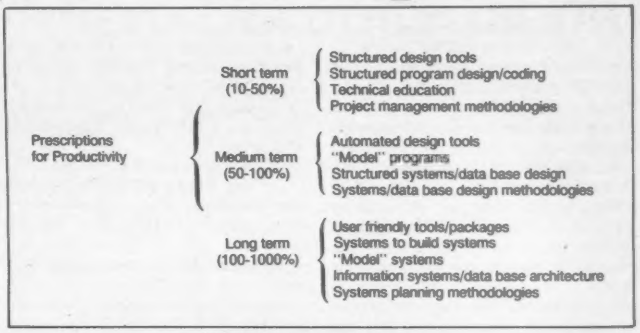
First, we must recognize that gains in productivity are directly linked to the time horizon (see chart). If you are interested only in short-term gains, you must be willing to accept gains in the 10% to 50% range. If you are willing to look ahead three to five years, then you may be able to accomplish 50% to 100% improvements in productivity. But if you really want to employ safely the kinds of futurist technologies that are being promised, you must be capable of looking at the very long run — such as from five to 10 years into the future.

As you can see, the big returns require long-term commitments, investments and the most precious of all resources — time. But note, most of the benefits promised from employing some of the snake-oil solutions actually occur if they fit into a long-range schema.

To make real gains, you need a game plan. Simply moving whichever way the hardware or software vendors are pushing may make things appear better in the short run, but in the long run they are apt to make things worse.

Snake-oil salesmen, like the devil, will always be with us, telling us how easy it will be and how much fun. But they are notably absent at follow-up meetings, at postmortems or Saturday morning command appearances in the president's office.

Orr is president of Ken Orr and Associates, Inc., a systems technology research and development company located in Topeka, Kan.



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Maybe Programmers Should Work at Home

By Edward Yourdon
Special to CW‡

While using personal computers offers DP professionals a faster, more flexible way of developing systems, the bottom line may be that personal computers are becoming the 1980s equivalent of the 1970s cry for "a terminal on every desk."

First of all, what do we mean by "personal computers"? The term is becoming almost as difficult to define as "minicomputer" was 10 years ago.

However, for the purposes of this discussion, a personal computer can be said to have the following characteristics:

- A dedicated CPU (typically an 8-bit processor, but possibly one of the newer 16-bit processors).
- At least 16K bytes of memory for work space, buffer area, computation and so on.
- A CRT screen and keyboard.
- A local hard-copy device — such as a teleprinter or a dot matrix printer of some sort attached to the machine.
- At least one attached floppy disk unit.
- The ability to connect the personal computer by means of a telecommunications line to a larger host computer.

If one ignores the requirement for a hard-copy printer (which might already be available in the programmer's office), one can purchase a personal computer that meets the described requirements for $2,000 to $3,000. This is roughly the same price that most DP organizations were willing to spend on "dumb" terminals only five years ago.

Programmer Productivity

What does this have to do with programmer productivity? The primary thing it does is to place a dedicated processor, memory and I/O device at the programmer's disposal.

In the vast majority of DP installations I have visited around the country, programmers are currently performing program development by using a dumb terminal to interact with a large mainframe. Almost inevitably, they find that the response time from the mainframe is either uniformly awful or so unpredictable that it becomes almost impossible to use for entering or revising computer programs.

By contrast, because it is dedicated, a personal computer provides a uniformly "instant" response to any task that the programmer is likely to perform.

Low-Speed Telecommunications

In addition, most time-sharing systems use relatively low-speed telecommunications lines to connect the dumb terminal to the mainframe; thus, the programmer often finds that he is "talking" to the computer at 300 bit/sec or perhaps 1,200 bit/sec. For input, this doesn't matter, but output from the mainframe is painfully slow at 300 bit/sec.

Perhaps the most common example of this is the text editor that the programmer uses for entering the text of his computer program. On most mainframe time-sharing systems, the text editor operates on a line-by-line basis. If the programmer wants to modify his program, he must first find the line that he wants to change, ask the editor to print it out and then make the appropriate changes or corrections.

The communications channel between the CPU and the CRT terminal on a personal computer is usually much faster — speeds of 19.2K bit/sec up to 50K bit/sec are common.

Thus, it is much more common to see screen-oriented text editors and other software support programs on the personal computers. One can examine an entire page of a computer program at once and then scroll forward and backward to look at other portions.

While I have not seen studies or statistics that document the extent of productivity improvement, I would estimate that the productivity improvement using a personal computer is somewhere on the order of 10% to 20%.

While this is indeed important, it is not a large enough factor to change the way the DP profession does business.

Working at Home

But there is something else about personal computers that will change the way we do business. The personal computer allows the programmer to work in an entirely different environment — his home. In other words, I feel that the personal computer will be the driving force behind the move toward the "electronic cottage" that is described by Alvin Toffler in his recent book *The Third Wave*.

One might argue that the same kind of electronic cottage — programmers

(Continued on SR/8)

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Product Specifics: The 2078 Display Station is built for flexibility, operating in bisynchronous as well as SNA/SDLC environments. It is built compactly to conserve space and even features a monitor that detaches for shelf placement. It is built to conserve energy, with efficiency features that allow the 2078 to operate on 58% less power while generating 41% less heat than its IBM equivalent. It weighs just 55 pounds, some 47% lighter than the IBM competition. And above all, the 2078 is built for people. The monitor is tiltable and the screen recessed. That screen, the keytops and all moldings are non-glare. The keyboard is movable for comfortable positioning.

The 2087 Matrix Printer also features SNA/SDLC protocol compatibility in addition to bisynchronous operation. It is both fast and quiet. A microprocessor-controlled print mechanism delivers high quality printouts at speeds up to 50% faster than the IBM equivalent. A bidirectional matrix print head seeks the shortest path to the next line, backwards and forwards, maximizing throughput. Acoustical engineering reduces noise levels, while a membrane switch panel, controls and LED indicators, all located on the front panel, provide the operator with local control and printer status.

The 2076 Remote Cluster Controller is a lightweight 30-pound package that accommodates up to eight printers and/or terminals in a bisynchronous environment. It measures a streamlined 6.5" high x 14" wide x 28" deep. While the 2076 can be located as far away as 4920 feet from its attachments, its dimensions allow for convenient placement just about anywhere, singly or stacked. Standard power-on, off-line and on-line diagnostics contribute to increased uptime.

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To Sell Execs on Personal Computers

Vendors Must Improve Micro Documentation

By Jay M. Sedlik
Special to CW‡

As more and more businesses begin to exploit the use of the personal computer as a productivity tool for executives and managers, one area of particular concern is the attitude of the executive user during the installation and orientation phase.

However, the current state of personal computer software does not allow the executive to perceive easily the value of using a personal computer.

Therefore, manufacturers and applications developers need to look closely at their current methodology for developing software and supporting documentation if they seek to propagate personal computer usage among executives and managers.

The ease of use of personal computers is currently in an interim stage of development, primarily because of the documentation for these systems.

Users are still burdened with performing a number of housekeeping, logistic and administrative tasks that are related to operating the hardware/software system. These tasks are often diametrically opposed to the reasons why executives have elected to use a personal computer in the first place.

Current Documentation

Much of the current documentation has been written by applications developers and, at best, simply walks the user through a series of steps. Several pages later the typical text often says something like, "Now that you have learned *x* try it out yourself."

The text may also mention a "quick reference card." This "aid" is often even more confusing to the neophyte user since the terminology, definitions and even its graphic layout have not been human engineered for ease of use and learning.

The typical personal computer sales approach has often been able to overcome executive buyer resistance by foreshadowing the early learning experience as "being a lot of hard work to get started, but if you are ever going to get the most out of the system, you have to work at really understanding what you have."

While this kind of attitude may be a by-product of burgeoning technology, it is not fair to the new executive user.

Investing Time

Industry experience indicates that an investment of between 30 to 80 hours is required for executives to figure out the logistics of computing and to identify the possibilities for changing the way they do their jobs. This investment in time is necessary primarily because of the state of documentation that introduces computer technology and applications to an executive user.

Assuming limited direct previous experience with computers, most executives can probably be expected to make a significant investment of time.

'An investment of between 30 to 80 hours is required for executives to figure out the logistics of computing and to identify the possibilities for changing the way they do their jobs. This investment in time is necessary primarily because of the state of documentation that introduces computer technology and applications to an executive user.'

However, this investment may not yield the productivity improvement expected and, consequently, many of these executives may give up. Improved vendor documentation should considerably reduce the learning curve.

Unfortunately, much documentation development effort still seems to be based on what subject matter experts want to tell users about the content, rather than on what the user has to be able to do in order to manipulate the system to his own advantage.

Recent studies have shown that to use personal computers effectively, executives must be able to do the following:

- Identify how the personal computer might help make their jobs more productive.
- Set up the equipment.
- Get hands-on experience quickly.
- Perform basic keyboarding activities.

(Continued on SR/8)

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Personal Computers Foster Home Programmers

(Continued from SR/6)

working out of their own homes — could be accomplished with dumb terminals too.

This is true to some extent, but the personal computer solves the following problems:

• Programmers often like to work during times that the mainframe is not available (and thus can't be accessed by a dumb terminal).

• The telecommunications costs involved in connecting a terminal at home to the mainframe at the office may be substantial — especially if the programmer lives far enough away that it necessitates a toll call. With a dumb terminal, this creates psychological pressure (if not actual edicts from the company) to avoid long sessions on the computer terminal.

• The telecommunications line used by the programmer is probably a voice-grade line. Therefore, it may have a lot of "noise" that will cause transmissions to be garbled — perfectly OK if one is using the terminal to send or receive electronic mail, but not at all acceptable if one is typing a Cobol program into the computer.

Thus, the personal computer allows the programmer to do the bulk of his work "off-line" to the mainframe. When appropriate, he can dial the mainframe and transmit data at reasonably high speeds.

Consequences for Productivity

What does all of this have to do with productivity? Consider the following:

• The average programmer spends one to two hours per day commuting to work. This could obviously be eliminated (or greatly reduced) if much of his work could be done at home.

• The average programmer spends a substantial amount of money to commute back and forth to work — involving expenses such as gasoline, train fares, automobile costs and so on. Inevitably, this is subsidized by the employer.

In *The Third Wave*, Toffler cites a study that suggests that the average urban employer pays a premium of $1,000 to $2,000 per year to employees to subsidize their travel costs (such subsidies are often in the form of higher salaries for urban workers than for their suburban counterparts).

Ultimately, I don't think that it matters very much whether employers think that this kind of environment is more productive. If the programmers themselves feel that a personal computer — either at home or in the office — makes them more productive, then I think they will begin to demand it.

Yourdon is president of Yourdon, Inc. of New York.

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Exec: Improve Documentation

(Continued from SR/7)

• Operate a minimum number of introductory utilities.

• Establish a set of personal objectives for working with the computer.

• Identify a personal plan that establishes how to get the required knowledge and skill.

Once the executive user can perform basic operational tasks and has identified the personal benefits to be derived from computer usage, the user can then progress to more detailed logistics such as handling formatting diskettes, creating backup diskettes and using the operating system and applications software.

Having mastered the entry-level skills, the user will be ready to use the computer to solve a business problem, analyze a potential personal computer application to be able to ferret out what really needs to be done or use the documentation and software provided with the selected application to apply computer technology to that business need.

From this stage the user should be able to progress to identifying other personal computer applications that may be of use, analyzing selected applications to determine their quality and usability and applying more advanced programming skills to develop personal applications customized to personal business needs.

This includes applying practical aspects of learning theory to the development of the software and documentation, devising simple instructional strategies and writing, testing and packaging this documentation.

The role the DP department can play in the executive or managerial implementation of the personal computer includes viewing it as another tool to expand their charter to bring computer power to the aid of their organization.

Sedlik is executive vice-president of National Training Systems, Inc., located in Santa Monica, Calif.

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Glass Firm Information Center Crystallizes,

Over the past year, the concept of the information center has been rapidly increasing in legitimacy and popularity among DP managers.

The information center is typically described as an organization within a company's DP department; its purpose is to support, assist and educate end users who want to do their own data retrieval, manipulation, analysis and presentation. These tasks are performed with easy-to-learn, "user-friendly" computer-based packages.

By Michael A. Steinberg
And Karen H. Smith
Special to CW‡

CORNING, N.Y. — The original intent of the information center concept was to improve productivity within the DP department by offloading many tasks to the end users, thereby reducing the ever-expanding applications development backlog. At Corning Glass Works, Inc., the emphasis on the information center is enhancing the productivity of the 8,000 white-collar employees of the company.

The Corning Information Center is staffed by a four-member team. This team is in daily contact with managers and staff from all areas of the company, including production, sales, marketing, planning, finance, engineering, research and development and personnel.

These information specialists help employees write their own customized reports, automate repetitive or mundane tasks and execute data analysis that was previously time or cost prohibitive. Many users take advantage of the computerized tools to access data from corporate DP systems.

The majority are using user-friendly tools to manage data that has never been managed before and that would never have become part of a DP department's backlog. The net result is documented improvement in decision making and productivity throughout the company.

Housed at the corporate data center, a part of Corning's Information Services Division, the information center supports a user community of nearly 500.

Tools Provided

Tools provided include IBM's A Departmental Reporting System (ADRS), SAS Institute, Inc.'s Statistical Analysis System (SAS), On-Line Systems, Inc.'s Foresight, Tektronix, Inc.'s Easy Graphing, Penn State University's Minitab and Application Software, Inc.'s Asist. They also support, but do not actively promote, Fortran, Basic and APL.

Corning's first experience with end-user computing occurred in the mid-1970s, when it was discovered that with a few days of training and an easy-to-learn report writer, end users could effectively produce their own reports.

By the late 1970s, Corning acquired additional tools and hired a DP staff member to provide a user service function, the predecessor of the current information center.

By the early 1980s, the company further expanded the library of tools and established the information center as a separate group.

During the past year, growth in information center utilization has been swift. About a year ago, an average of 30 different users per week were making use of these tools.

Today, between 160 and 180 us[illegible]eek take advantage [illegible] capabilities — a sixfold increase in one year. Furthermore, these users represent a mix of business areas.

Based on the productivity gains achieved by current users, Corning expects this growth trend to continue. To provide capacity for this

Abandons the 'Fluke Syndrome'

Firm Corrects Error-Prone Task of Debugging

NASHVILLE, Tenn. — Ken Landrum, second vice-president and manager of systems support for the National Life and Accident Insurance Co. here, was assigned the ambitious task of "doing anything he could to improve programmer productivity."

In June 1979, an ad titled "Why Do You Think They Call It A Dump?" was routed to his desk. Although he was skeptical of the validity of the claims made in the ad, Landrum figured that if a packaged product could help with even a small portion of dump analysis, it would be a step in the right direction.

So he placed a call requesting additional documentation and IBM's System Management Facility (SMF) Analysis Program for a software product from Compuware Corp. called Abend-AID.

Upon receipt of the materials, Landrum initiated a feasibility study, beginning with the SMF Analysis Program, to determine the potential cost savings in using Abend-AID.

Feasibility Study Results

This program was run against five weeks of SMF data and indicated that $11,777 could have been saved within the five-week period if Abend-AID had been on his system, thus making the potential yearly savings exceed $118,000.

The breakdown for that five-week period showed a savings in programmer time or $7,844 or 314 hours. Additional savings amounted to $3,933 for the same period.

Based on this, the payback period for Abend-AID would have been only three weeks. Landrum decided to try Abend-AID on a trial basis.

The parent company of National Life maintains two IBM 370/168 computers and runs two 12-hour shifts, seven days a week. The 370/168 is also used by NLT Computer Services Corp., an affiliate that sells machine time and manpower to 2,000 clients. Therefore, the decision to evaluate further Abend-AID affected a diverse group.

'Fluke Syndrome'

Up until this point only the IBM dump and what Landrum refers to as the "fluke syndrome" were used to debug. This syndrome states that "whatever caused my program to abend was merely a fluke, so I'll just rerun it to see if it happens again."

Landrum said he had always looked for a method that removed the menial and error-prone task of debugging, but everything seemed as worthless as "rearranging the deck chairs on the Titanic just before it sank."

By August, with the input of his project managers, the parent company was producing an average of 400 abends each week, and 90% of these were successfully diagnosed. Abend-AID, having performed well in the company's environment, which included 20 other software products, was purchased.

Time Saved

NLT has had the product on their system for almost 3½ years, and a vast amount of programmer time and computer resources have been saved.

According to Landrum, the operations staff now has the ability to discuss problems with the applications programmers and resolve them on the spot.

Landrum estimates annual savings of approximately $100,000 from Abend-AID. In addition, he cites benefits ranging from reduced hardware utilization to increased operations productivity.

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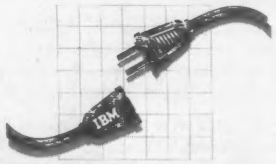

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Strengthening Decision Making, Productivity

growth, Corning is planning to install a separate processor dedicated to end-user computing.

In addition, networking capabilities are expected to allow the expanded use of these tools by branch plants located outside the Corning area.

Information center users have formed a user group to represent their interests to corporate management and to provide a backup network of expertise. This group meets regularly to hear presentations from information center staff and other users. In addition to this, smaller groups with special interests meet to share their experiences.

Thus far, the most ambitious effort of the users group was the organization of a conference on "Productivity Improvement through Computing" held last year. More than 1,000 Corning employees visited this conference and saw demonstrations by more than 30 current users and attended tutorials by the information center staff and several vendors.

'Success Stories'

Demonstrations included "success stories" of productivity improvement by employees in every area of the company. Some of those are:

• **Graphics for Sales Literature and Publications:** Another Corning business uses Easy Graphing to produce high-resolution black-and-white charts and graphics for sales literature, product information sheets and papers published in technical journals.

These high-quality graphics, which are available in-house, save Corning the cost of having them produced by a professional draftsman, which would bring the cost to more than $20 per graph. Graphs are now produced for a few cents per copy.

• **Product Line Forecast Model:** One division has developed a market forecast model to project future glass manufacturing demands using Foresight as a modeling tool.

This model incorporates historical data together with projections of about a dozen market variables to perform "what if" analyses and produce 25 printed reports necessary for fine tuning of manufacturing planning. In addition to this, any one of the reports can be viewed on-line as data is manipulated.

This model has reduced the forecast cycle time from three days to between 10 minutes and 15 minutes. In addition, it permits sensitivity analysis of the marketplace and greatly enhances the power of the evaluation process.

• **Market Survey Tabulation Program:** The SAS package was used to create a program that can tabulate any survey or survey-type data. It provides frequency of responses for any type of question — multiple choice, fill-in-the-blank or comments. This program is used to provide an overview of a survey or any question/response-type data.

The program has enabled businesses at Corning to execute, in-house, $90 million worth of mail surveys for less than $10 million.

It is impressive that with a few days of training, non-DP managers and staff are able to demonstrate time and dollar savings with the use of information center tools.

Having established a successful base-line operation, Corning looks forward to expanding its information center concept for improving white-collar productivity in 1982 and beyond.

Steinberg is an information services specialist and Smith is a business analyst, both in the Corporate Information Center at Corning Glass Works, Corning, N.Y.

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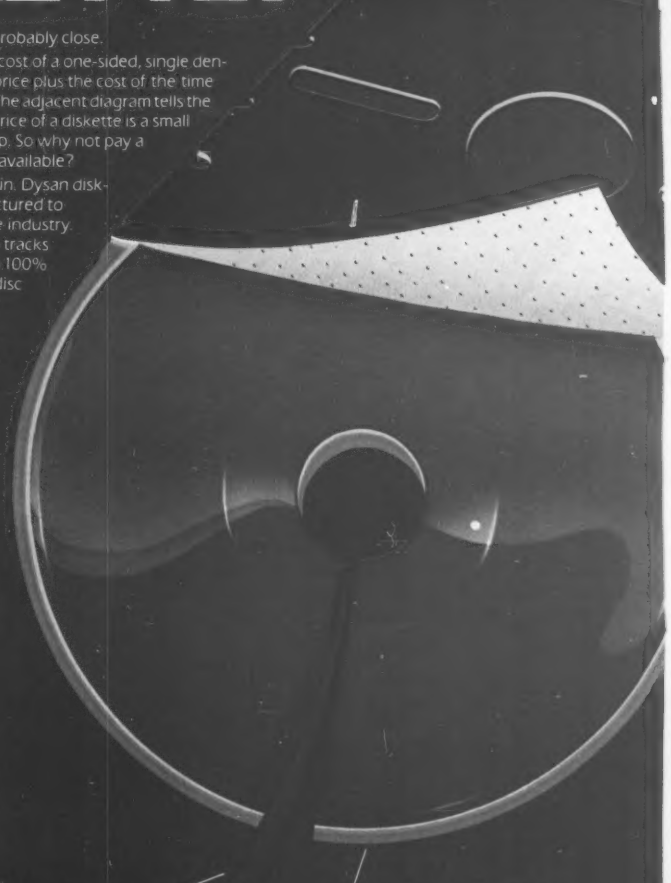

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Systems Development: Heuristic or Prototyping?

By James C. Wetherbe
Special to CW‡

There are two major problems with the way we currently develop information systems — we take too long to develop them, and we never get the right system the first time.

Even though it virtually always results in major reworks, we continue to develop systems as if users can tell us what they need through traditional systems analysis. Unfortunately, managers have difficulty defining their information requirements purely by such analysis. That is why once users start to use the system they begin to learn and ask for what they really need.

'The fact that users ask for changes once a system is in place suggests that defining user requirements needs to be a heuristic or learning process allowing for an iterative or evolutionary development process.'

The University of Minnesota and its graduate school of management's Management Information Systems Research Center (MISRC) work with 20 major firms based in the Twin Cities on information systems research issues of common interest.

The current No. 1 issue is improving information systems development methodology and reducing the time between user requests and system response. Researchers are using advanced techniques such as heuristic developing and prototyping to come up with some positive results.

The fact that users ask for changes once a system is in place suggests that defining user requirements needs to be a heuristic or learning process allowing for an iterative or evolutionary development process. Managers should be given the opportunity to work with the output of a system before a massive development effort goes into the final system.

What exactly is heuristic development and prototyping, and how do they differ?

Heuristic Development

The premise behind heuristic development is that most people like to solve problems using a cognitive style that is intuitive and heuristic. That is, they like to come up with a rough solution and shape the rough solution into a refined solution by trial and error.

Consider, for example, the way most of us solve puzzles such as Rubik's Cube (in this instance, "attempt to solve" is often the case). Most people get a general idea of what they are trying to do. Within a few seconds, they generally start manipulating the cube to learn how it works. Strategies that don't work are rejected and ones that appear to work are explored further until a solution is reached.

Heuristic development recognizes the intuitive and heuristic cognitive style used by people and exploits the advances in computer technology that allow for a more flexible approach to systems development. These technologies include on-line systems, data base management systems (DBMS) — particularly those designed on a relational model — high-level query languages and decision support systems.

The steps involved in heuristic development are as follows:

1. During the analysis step of systems development, develop a broad understanding of data currently used to support the decision making and operations at the organization.
2. Collect samples of whatever machine-readable data or manual data is available and load it into a data base using a sample sequential physical structure for each file.
3. Postulate from Step 1 what fields should be used as indexes to each file and establish them as indexes. If multiple files are involved, any obvious relationships between files can be established using whatever technology is provided by the DBMS.
4. Using a query language, develop screen formats and reports for information currently required by the user. Also, postulate and develop additional screen formats or reports that could be useful.
5. Train users in the operation of the system and have them spend time interacting with it. The experience gained by the user interaction with the system's technologies and capabilities functions as a catalyst that allows users to more fully envision and articulate their information requirements.
6. Based on the information gained in Step 5, revise the system by making user modifications such as adding new fields, creating new data relationships, modifying screen formats and so on. Eliminate indexing of data fields that are seldom used as indexes; this is a performance consideration. Any queries used frequently may be coded into a higher performance language such as Cobol to increase response time (this is also a performance consideration).
7. Repeat the sequence of Steps 5 and 6 until the system is relatively stable.
8. Design an input system to provide edit and update capabilities for the data structure and the output system and proceed with the remainder of the development cycle.

The methodology allows the systems analyst to heuristically define user information requirements while designing and developing an output system. This approach provides managers with an opportunity to have tangible, realistic exposure to the new system as they learn the capabilities of the new technology and refine their information requirements. Once the output system is accurately shaped to fit user requirements, an input system should be designed and developed.

The design and development of an input system after the development of an output system is a logical sequence.

The development of an input system with data collection, transaction processing procedures and a proper edit and update system is usually a major effort. The design requirements for an input system are easier to define and less susceptible to change if a stable output system is already completed.

Like heuristic development, prototyping recog-

(Continued on SR/15)

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For General Applications Development

Go 'Nonprocedural' to Close Productivity Gap

By Alan L. Codkind
Special to CW‡

One of the stickiest dilemmas facing the data processing environment today is how to close the productivity gap caused by using sophisticated new hardware with outdated programming languages and software methodologies.

In a response to this dilemma, state-of-the-art software companies have introduced nonprocedural-based systems for general applications development. Such products include Mathematica, Inc.'s Ramis II, Information Builders, Inc.'s Focus and National CSS, Inc.'s Nomad.

Following suit, IBM recently announced SQL/DS. These tools have been called "fourth-generation" languages by some. Others refer to them as "programmerless programming." In any case, a large majority of the Fortune 500 corporations have successfully employed one or more of these products to implement thousands of applications in a matter of weeks or days — not months and years.

Nonprocedural technology allows a user to specify the results desired without having to explicitly state the step-by-step instructions necessary to accomplish the task. The need for detailed instructions required by traditional procedural programming has proven to be the primary bottleneck of the application development process because it can only be handled by a person conversant with a programming language like Cobol.

A nonprocedural application development environment (NP/ADE) is a complete applications development facility. The data base approach provides order, flexibility and reliability, while the nonprocedural commands are easily understood ways to specify design, maintenance and reporting tasks. It is from these brief commands, which are so powerful when compared to traditional procedural languages, that programmerless programming gets its name.

The two biggest obstacles facing the applications builder are speed of implementation and the accurate com-

(Continued on Page SR/16)

Heuristic Style Vs. Prototyping

(Continued from SR/14)

nizes the cognitive style issue and exploits advanced computer technology. The basic steps of prototyping are as follows:

1. Identify users basic needs in terms of information and operating requirements.
2. Develop a working prototype that performs only the most important identified functions using a small representative data base.
3. Allow the user to use the prototype by demonstrating how the prototype works and responds to requested changes.
4. Refine the prototype by discussing requested changes and deciding which ones should be included in the next version of the prototype. After the next prototype is created, Steps 3 and 4 are repeated until the system fully achieves the requirements of the user. Proceed with demonstrations to other users (if necessary) or with system development.

Significant Differences

Heuristic development and prototyping share a great deal in common. They both recognize the cognitive style issue and they both require advanced technology. There are, however, significant differences.

Prototyping advocates developing a simple system that is refined through an iterative process. At some point a decision may be made to discard the prototype, having learned what is needed, and a formal system development process initiated. Alternatively, the prototype may become a production system.

Heuristic development, on the other hand, advocates only developing an output system on an iterative basis. The output becomes part of the production system. Once the output system is developed, heuristic development argues for returning to an engineering, disciplined approach to developing the input and file maintenance system using conventional structured techniques. In other words, prototyping advocates a creative, trial-and-error process for developing the whole system. Heuristic development only advocates this strategy for the definition of system outputs.

Wetherbe is on the faculty of the management school and director of MISRC at the University of Minnesota.

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Nonprocedural Systems Close Productivity Gap

(Continued from Page SR/15)

munication of system specifications. NP/ADEs have several advantages over procedural languages which make them a particularly attractive tool for increasing programmer productivity:

- They are easy to use and do not necessarily require a DP background. This creates a vast new pool of programmers — the end users.
- Physical coding of programs is reduced to a fraction of that required to write a similar Cobol program.
- State-of-the-art data base technology allows major changes to the application to be made simply.
- Incorporating data from multiple sources does not require changes to the data base design. For example, you can tie shipping information to forecast information dynamically without changing the individual shipping and forecast applications.

None of these features are available using Cobol-based systems. Users of NP/ADE cite large time savings over that of Cobol-built systems. Dr. John Crowley, while manager of interactive systems at Bank of America, found that nonprocedural languages provided a 20:1 reduction in physical code at his installation. In addition, a user community of more than 1,000 was supported by a staff of only six people, since much of the programming was done by the users themselves.

The foremost reason for these dramatic productivity gains is the high level of intelligence of the NP/ADE. Many of the lower level programming tasks are assumed by the NP/ADE itself. NP/ADE does use more machine resources, but it is a favorable trade-off when we consider that it maximizes the resources of data processing's most valued commodity — the programmer.

These fourth-generation systems are quick and versatile. So why not just substitute this new tool for Cobol and proceed to fame and glory? Because only half the problem has been solved. We have a way of significantly decreasing the time required to build an application but have not yet demonstrated how to span the communications gap. The solution to closing the communications gap lies in the methodology used with nonprocedural systems to build applications. The typical development methodology used by most DP shops is bound by formal specifications.

The system specifications serve as an "implementation bible." Using this method, both parties will know exactly what is to be implemented and the specification document is the communications vehicle. No system is ever implemented without formal specs.

The usual assumption is that with such a formalized procedure, projects developed would be accurate and on-schedule. After all, this methodology has been used for at least 15 years. But therein lies the rub. Time and time again, regardless of the company, this development methodology has failed to produce satisfactory results in this era of information systems.

While this traditional approach worked well for stable, accounting-based applications, it has collapsed under the complexities of today's decision support environment. Ask a manager today what information he will require tomorrow to make a decision and no answer is possible.

Today's information system requirements are dynamic and complex — a system may be totally obsolete a year from now. If it takes longer than that to implement the solution, the chances for success are minimal.

The NP/ADE reduces the implementation time to a manageable level while its flexibility and ease of use add a dimension previously absent in the development process iteration.

Problems Solved

This iterative methodology has overcome many of the problems associated with traditional applications development:

- As the end user and system developer learn about the requirements of the application, changes can be easily incorporated. Miscommunications become readily apparent.
- Modifications to the system are based on actual use — not perceptions and assumptions.
- Continual changes in the business environment can be fed back into the development process. We are not attempting to take a snapshot at one point in time and freezing the system at that point.
- As the user's expectations change because of increased awareness of DP facilities, so may the system capabilities expand.

In summary, the NP/ADE is right on target in attacking the problem of people productivity. But it is not a panacea.

Codkind is director of marketing for Non-Procedural Systems, Inc. of Ridgefield, Conn.

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Complete Specification Needed

Greater Programmer Productivity Wrong Focus

By Peter D. Lamasney
Special to CW‡

The current cry in the data processing community for greater programmer productivity will only distract us and delay even further our coming to grips with the real problems. The perceived crisis of programmer productivity is only symptomatic of a failure to manage, plan and design adequately data processing systems.

We don't need any more programmer productivity. We certainly don't need any more of the things that are being produced lately: systems that fail, systems that do not meet the user's needs, systems that require maintenance to such an extent that upwards of 80% of their total cost is expended in this area, systems that never get implemented and systems that are too rigid to respond to the changing world.

Data processing today is an artisan form. At its best, perhaps even a craft. The term "computer science" is a joke.

It is well known that managing programmers is a difficult task. Programmers are flighty and temperamental, never seem to get the job done, work on what they want to work on when they want to work on it and cannot estimate accurately.

Why is this? Because a programmer is an artist. A programmer is expected to invent. You cannot manage a creative artist to the extent that data processing would like to manage a programmer. This is why structured programming has not produced the qualitative and quantitative improvements that we want and need.

Programmers Wrong Target

In short, programmer productivity is the wrong target of concern. Programmers usually work from some sort of specifications. If the specifications are not clear or complete, or worse, if the specifications do not exist, it is unreasonable to expect programmers to construct exactly what is required.

Perhaps a more critical issue is analyst productivity. Exactly what is it that needs building? What are the attributes of the desired system and what is it supposed to do? How does it fit with other systems? Where do these inputs come from, and how are they operated upon? What do they cause to happen? When was the last time you saw a set of specifications that adequately answered these questions?

We have a lot to learn from the construction industry, which adheres to the following steps:

- Requirements and objectives.
- Architectural process, which yields specifications.
- Construction, usually on a fixed-bid basis, given the specifications (normally including an early completion bonus).
- Inspection and acceptance.

Note that the creative aspect is in the architecture, not the construction. The creative aspect is in the design, not the programming. The objective should be to make the programming process boring, clerical, manual labor. We don't need programmers, as defined and used today. We need architects, and we need construction workers. We need designers and we need coders.

Planning is difficult in an area that does not have a meaningful standard unit of work. There is one standard unit of work for the programming process: the line of code. However, the work objective is not to produce code, but a system that works.

Addressing programmer productivity will only allow us to reinvent the wheel more rapidly. Substantial gains in DP productivity will not be forthcoming until we address the architecture of systems. New systems contain very few new functions. New systems usually are composed of existing functions — functions that have been designed, written, tested and installed long ago.

New systems might assemble these functions in a different sequence or invoke them under different conditions or cause them to operate on different information or attach them to different input/output mechanisms, but they are the same old functions.

Addressing architectural productivity will allow us to stop inventing systems and start assembling systems from the parts that we have already constructed.

When we adequately begin to design data processing systems, real productivity gains will be forthcoming.

Lamasney is president of Smallframe Systems, Inc., a San Francisco-based supplier of software for stand-alone and satellite systems in a distributed environment.

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Training Programs That Stress People Skills

By Ronald Episcopo
Special to CW‡

Managing people is a tough job. And the position of manager is becoming more complex and more demanding, requiring heavy emphasis on people skills. Traditional management training programs have to be revised if they are to fulfill the needs of current and potential DP managers.

The reason for this is that current training methods do not emphasize the communications skills that the technically trained DP manager lacks. In many instances the technically trained professional will happily move into the role of manager only to discover that the promotion does not automatically endow him with the ability to manage people.

As a result, DP professionals have progressed in their careers without having to develop communications skills — until now. If the DP managers are to be secure on this rung of the ladder and continue to be upwardly mobile, management development programs must change to fit their needs. The initial focus must be on communications. Also, the approach taken in training must change from traditional training to consultative training.

Three-Phase Approach

A total management development program that has been found to be effective for data processing professionals is designed according to a three-phase approach: communications, management skills and executive effectiveness.

In day-to-day communications, to create a foundation for the successful progression of the program, there has to be a period for self-analysis. Before being able to motivate people and communicate with them, DP managers must understand who they are, why they are there, what is expected of them and what their personal goals and priorities are.

As a DP manager it is no longer possible to sit behind a closed door. The manager must learn how to juggle the different personalities that make up the data processing center. These people are generally creative and require a different type of managing. DP managers then must learn when to guide, when to nurture and when to provide strong management to their employees.

Another communications skill the manager must learn is how to conduct a meeting. Nobody likes to attend meetings that prove to be a waste of time.

It is important for the manager to know when to call a meeting and possess the skills to communicate what needs to be said and solicit information from subordinates. Without this ability, a meeting will conclude with unaccomplished goals. The skills needed include:

- Providing an agenda which focuses on the topics to be covered.
- Determining who will be effective participants at the meeting.
- Controlling the meeting so that each discussion is constructive and getting people to participate.
- Recognizing when a topic has been exhausted.

Traditional Training Fails

Traditional management training methods fail because they typically follow the "teach-and-dump" approach where the instructor teaches the course and then leaves. To have some impact on the quality of management, on-going, real-life analysis must be applied to this area of training.

For example, it is not reasonable to expect to change the poor communications skills of a 33-year-old person in a two-day training session. In some cases there may be some short-term impact on

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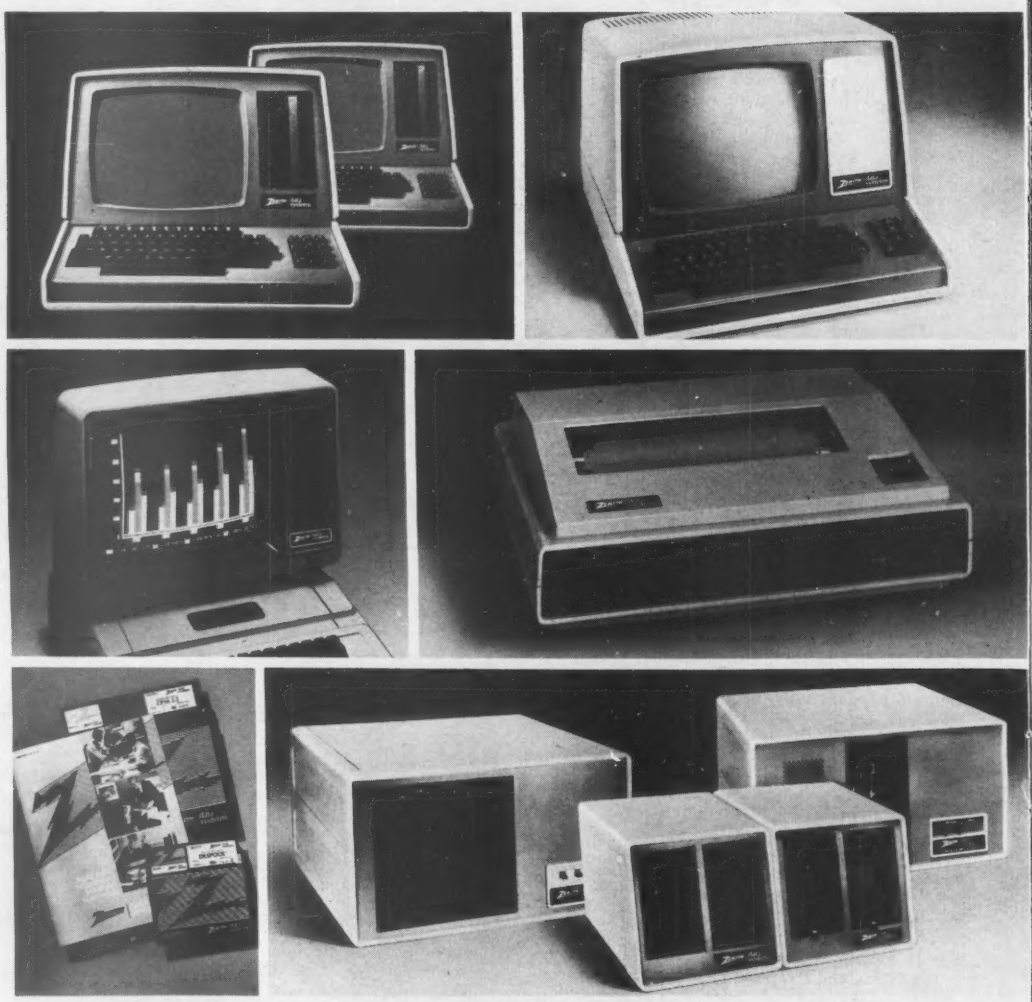

Necessary to Fulfill DP Managers' Needs

those skills, but in the long term the change will be insignificant. The real-life analysis is a corrective approach that continues until all skill deficiencies are corrected.

Using this approach the scope of the training program and DP manager's training curve is broadened to include such additional training functions as:

- Allowing DP managers to meet individually with the training consultant to discuss specific problems.
- Allowing the consultant to sit in on the DP manager's meetings to observe on-the-job behavior and to be able to advise on particular incidents.

Behavior patterns, if they are to be effectively corrected, have to be observed over a period of time. The length of time obviously differs with each DP manager.

Typical Time Involved

Using effective meetings as a typical example, the time off the job averages 3½ hours, broken down with the classroom presentation taking two hours and individual consultation covering three half-hour sessions.

The consultant will then spend the balance of the program attending the meetings that are called and conducted by the DP department manager.

Phase II of the management training program is related to skills or knowledge that a manager must possess. They tend to be more procedural in nature, such as learning about personnel policies and other company requirements.

In addition, this phase deals with the more traditional motivational and leadership theories, which are often looked upon as academic learning.

Ability to Progress

Here the concern is with the individual employee's goals and ability to progress. The insight managers must develop is the ability to evaluate a subordinate from a multidimensional point of view.

This involves considering the person as having many interests and many attitudes and understanding that at any given time an employee will be functioning at different motivational levels. This approach may, in fact, precipitate job redefinition and design.

This is an area that is rarely covered in management training programs and is geared for the DP manager who desires to move up to executive management. It may not be for all managers, in fact, there may be some who will elect to stop after Phase II.

It is true that an executive with an MBA degree has a better opportunity for a key management job and the DP manager is overlooked.

There are also cases where executive positions in data processing are filled by non-DP management. One reason would include the following:

A manager's lack of communication skills in being able to present himself to top management — being noticed and being acceptable. Being acceptable means being able to fit into that corporation's image.

Although many people find such conformity distasteful, it is, unfortunately, part of the real world, and so training programs must include an executive-image course.

This carefully constructed training is needed to help DP managers move into a key position — a corporate decision-making position that will, in time, provide a new image for the DP environment.

Episcopo is an employee of Software Design Associates, Inc. of New York.

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Minis Spur Increase in User-Friendly Systems,

By Van B. Thompson
Special to CW‡

How can the explosion of user-friendly systems be controlled? If by "control" you mean "prevent," forget it. Your users won't allow it.

The proliferation of user-friendly systems is being spurred by minicomputers. Five miles from my office is a $3 million manufacturer and distributor of marking products with 85 employees. About a year ago the controller selected and installed a minicomputer to handle the usual financial applications.

In selecting this system he was attracted to the advanced ad hoc reporting capabilities of this mini. Neither he nor anyone else in the company had technical background in computers, but he wanted to avoid the cost and time of having to rely on an outside software consultant every time he needed a special report.

After a year of use (but only a few hours of formal training), this controller has personally developed several reports that are run regularly.

Moreover, without having to program, he is using these tools on a daily basis to create truly ad hoc reports without programming. One such report is evaluating how one department's sales are doing relative to other departments of the company.

A few hundred miles away, one of the largest insurance companies in the country (with massive mainframe computer power) uses several of the same model minis in user departments.

Prototyping Developed

In one department, the mini's relational data base management system (DBMS) and ad hoc retrieval tools are central to a departmental skills inventory system that covers 760 managers and technical people.

After spending almost two years attempting to describe and agree upon all possible skills and categories, it was realized that the DBMS and retrieval tools would allow prototyping. For example, the DBMS is fully variable, including use of multivariable fields, so all possible skills need not be set up.

Within two weeks the system was operational, and today project staffing, development of training plans, organizational planning, management of personnel, recruiting for replacement of terminated personnel and other functions within the department make routine use of the system, including skills that were unknown at the time it was implemented.

Common Thread

There is a common thread in these two examples: the migration of the program development function away from the classic centralized methodology and into the end-user arena. This movement was preceded a few years ago by a similar migration of data entry.

The reasons for this pending explosion of user-friendly systems are rooted in the need for productivity in both DP and user departments.

A recent study by the Sloan School of Management at MIT found an average systems project backlog of 30 months in the firms studied, that a majority of the projects studied were substantially behind schedule and over-budget and that one-third of all projects are being abandoned because they cannot be completed in time to be useful.

Analysts and programmers are in scarce supply and expensive. Attempts to improve the productivity of these key people through techniques such as on-line program development have helped, but obviously have not solved the problem.

Add to this the pressure being put on user departments to improve their own productivity, and it is clear that something has to change.

3278 and VT 100 capabilities in one display
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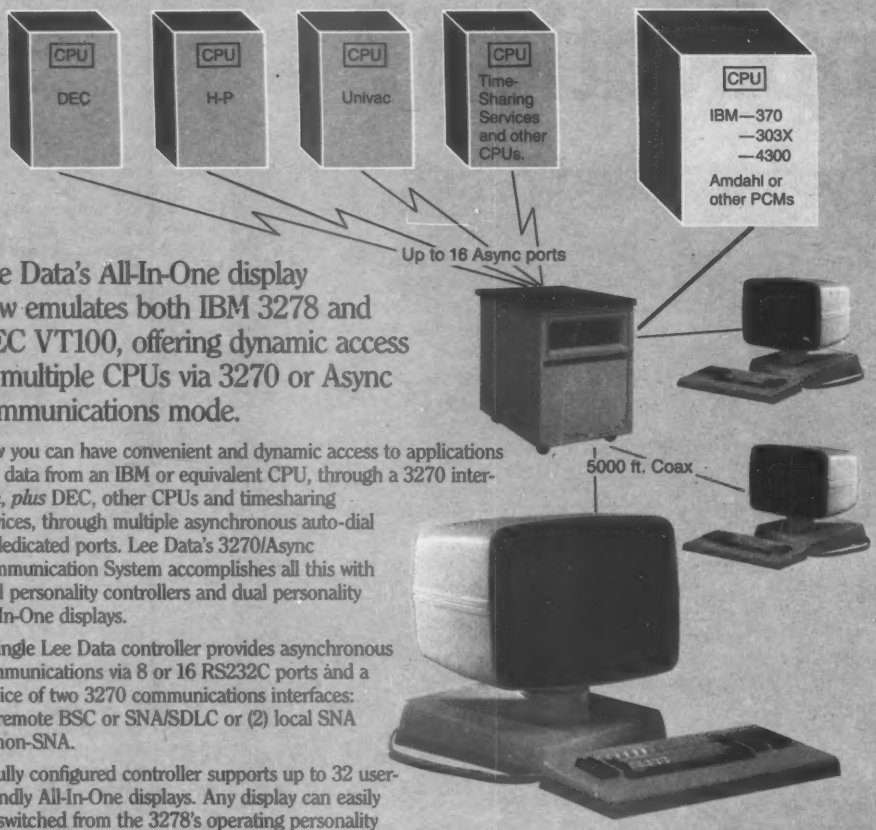

Lee Data's All-In-One display now emulates both IBM 3278 and DEC VT100, offering dynamic access to multiple CPUs via 3270 or Async communications mode.

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Giving Users Tools to Create Own Programs

Increasingly, the solution to this dilemma involves giving the users tools with which to create their own programs. The elements of this solution include development of effective relational DBMS and of nonprocedural tools that are by definition user-friendly.

These capabilities have flourished at the minicomputer level. Lately, where the operating system environment is transaction-oriented and includes a good relational DBMS, some excellent user-friendly program development tools have become available on some mainframes.

Both Sides Right

Not everyone is in agreement about the best approach to take.

For every Grace Hopper, cheerfully describing mainframes as the dinosaurs of DP and forecasting their replacement by systems of small computers, there is a Ken Orr, characterizing small user-friendly systems as toys without the capacity to attack mainframe-size problems.

As the distinctions between micros, minis and mainframes becomes more blurred, it's possible they are both right. For example, a local company I know of has a need to retrieve a variety of ad hoc reports from a file that is maintained on 40 reels of 6,250 bit/in. tape — well over seven-billion characters. The idea of downloading this file to a departmental minicomputer seems

However, this would be possible on a network of seven or eight 1M-byte processors which, with adequate disk storage, would cost between $400,000 and $500,000.

Today this company batches its inquiries and runs them against the file at night. Immediate retrieval isn't worth the price.

How Long?

But how long will it be before that price is cut in half and cut in half again? And if you had a network of seven or eight 1M-byte machines operating a multibillion-byte data base, how would you classify the system? A network of small systems? A distributed mainframe?

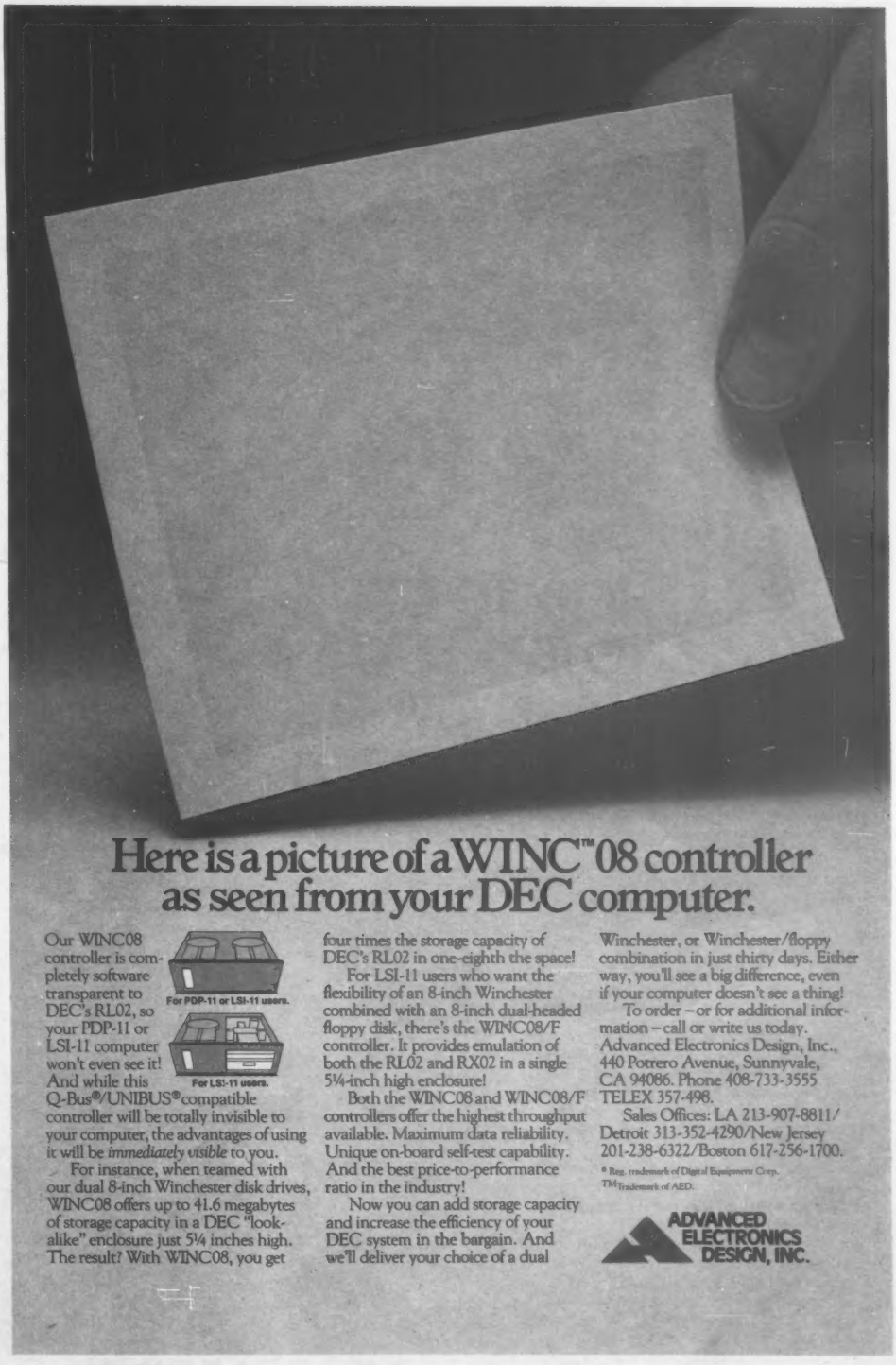
Suppose this company had the user-friendly tools and the operating system environment with which to put its users on-line to this file, at a reasonable cost, on its mainframe. What impact would these ad hoc reporting procedures have on production?

On the other hand, if the user departments are encouraged to get departmental minis, how can hardware and software compatibility be maintained? Or have the rules changed so that compatibility isn't necessary any more?

The answers have been suggested by many others. The central DP or management information systems organization can reach out to the user departments as consultants and educators.

Along the way, it may be necessary to shoot a few sacred cows. For example, as nonprocedural report-writing and application generator tools become more available, why worry about hardware or software compatibility? All that is necessary is that adequate packages or the tools needed to redescribe a system are available with the new hardware. And prototyping with a user-developed quick-and-dirty implementation followed by successive improvements can break the new systems design barrier once and for all.

Thompson is presently senior account executive with the Minneapolis office of Systems Management, Inc., specializing in manufacturing control, accounting and distribution systems.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Walk-Throughs: How Valuable?

Study Finds Kinks in Program Specifications

By Gopal Kapur
Special to CW‡

Software productivity has been a target as elusive as a prize for most DP organizations. Despite promotion within the industry during the past few years, numerous studies indicate nothing significant has resulted in the areas of implementing and effectively using programmer productivity and software engineering techniques.

The data processing industry is seriously concerned about the poor quality of software produced, low programmer productivity and the extremely high costs of producing and maintaining software.

At Kapur & Associates, we wanted to study the actual use of specific tools and techniques that contribute to quality software and high productivity. Four years ago, we started conducting two separate formalized studies: a program specification study and a study of walk-throughs and program prototypes.

Of the 68 program specifications studied, 25 related to two new systems, 17 were additions to existing systems and 26 were for maintenance of existing programs.

The authors of these programs were asked to keep complete records of all changes made to the specifications and programs. Program changes due to programmer errors were not counted in this study. The changes were collected and classified. The results were as follows:

- Changes in program's function — 18%.
- Errors in specifications — 26%.
- Omissions in specifications — 22%.
- Ambiguous/inconsistent specifications — 16%.
- Improper scope of placement — 12%.
- Typographical errors leading to logic errors — 6%.

From these figures it is clear that 82% of the errors can be traced to the quality of the specifications, not to the often-heard phrase, "Users never know what they want and keep on changing the specifications." Conclusions drawn from this study are:

- Typical program specifications are incomplete, contain ambiguities and inconsistencies, two or three major errors and an equal number of omissions.
- Most of these problems are detected by persons other than those involved in writing the specifications.
- In many cases, omissions are not detected until after the product is delivered; omission detection did improve, however, with walk-throughs.

Poorly written specifications lead to constant reworking of the program during development and after implementation. This, in turn, leads to unreliable software, preimplementation maintenance and the need for excessive testing due to ever-changing problem descriptions. Invariably, the results are slipped schedules, frustrated programmers and unhappy users.

This study further supports the already documented fact that the cost of correcting an error increases exponentially as the programmer moves from the specification stage to program implementation. In addition, errors discovered after implementation have the additional sting of embarrassment, since these errors are usually caught by the user rather than the programmer.

A follow-up survey of 32 major DP organizations revealed that only three firms had any type of standard for writing program specifications and not one of them was using an interactive specifications development process.

Specifications Problems

To attack the problem of poor specifications, concerted effort by data processing professionals is needed. From our research and experience of this subject, we suggest using a disciplined approach to developing specifications and recommend the following:

- Standardized interactive program specifications.
- Standardized interactive report specifications.
- Guidelines for auditing report specifications.
- Properly phased walk-throughs.
- Specifications change control procedure.

We strongly believe that the quality of specifications and the level of documentation can be significantly improved through the use of a standardized (interactive) specifications development approach.

This study consisted of a 28-ques-

(Continued on SR/26)

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Management Approach Must Involve 'Soft S's'

By Janet Bensu
Special to CW‡

The Japanese approach to management has been to emphasize what is known as the "soft S's" — skill, style, staff and superordinate goals and not just to favor what can be termed the "hard S's" — strategy, structure and systems.

In some cases all of these S's are intertwined, and it is difficult to separate one from the others. However, as an internal and external DP consultant, I have seen a decided lack of attention to the soft S's.

Organizational change can create havoc on the staff of a DP department. This includes a change in the direction and philosophy of the department or how the department interfaces with its users. I have seen work almost come to a screeching halt while everyone tries to find his comfort level when such a change takes place.

A change in one's manager or supervisor has a significant impact on an employee. Reestablishing rapport and trust with someone new is often a difficult task. Restating goals and objectives and building a good working relationship takes time and also can take a toll on productivity.

Planning Process

Another sore spot that ruffles organizational feathers is the planning process. The DP staff may not have a sense of the company or where that company is going.

A good planning process places the right people at the right time on the right projects. But often half the DP staff is frantically trying to meet a deadline, working overtime and weekends, while the rest are sitting around bored with little or nothing to do. This is an alienating situation and can decrease productivity.

Communications has always been important in maintaining staff morale, but it is often the root of many problems that exist. Feedback is vital to performance. I remember someone showing me a memo from the head of a department expressing recognition for hard work and long hours spent on a project. The reaction from the employee was: "This has made it all worthwhile."

Without such regular expressions of appreciation or, for that matter, constructive criticism, it may not be surprising that a DP professional has little commitment to working for any particular company. The company may ask for a commitment from its workers, although it is unwilling to provide a commitment in return.

Although good planning, good communications and well-thought-out training programs contribute to the environment for improved productivity, the DP manager may not have defined what being productive means.

Does the DP department have a program that consistently and objectively measures and evaluates productivity? Are there project management and project development standards to follow? These are hard questions, but ones that have to be answered.

But let's change gears and assume that the management of the DP department has a real commitment to improving productivity.

Dr. Charles Garfield of Peak Performance in Berkeley, Calif., is one of the world's leading authorities on improving human performance and productivity. As a mathematician and computer analyst working on the National Aeronautics and Space Administration's Apollo moon landing, he has had an opportunity to observe what allows people to

(Continued on SR/26)

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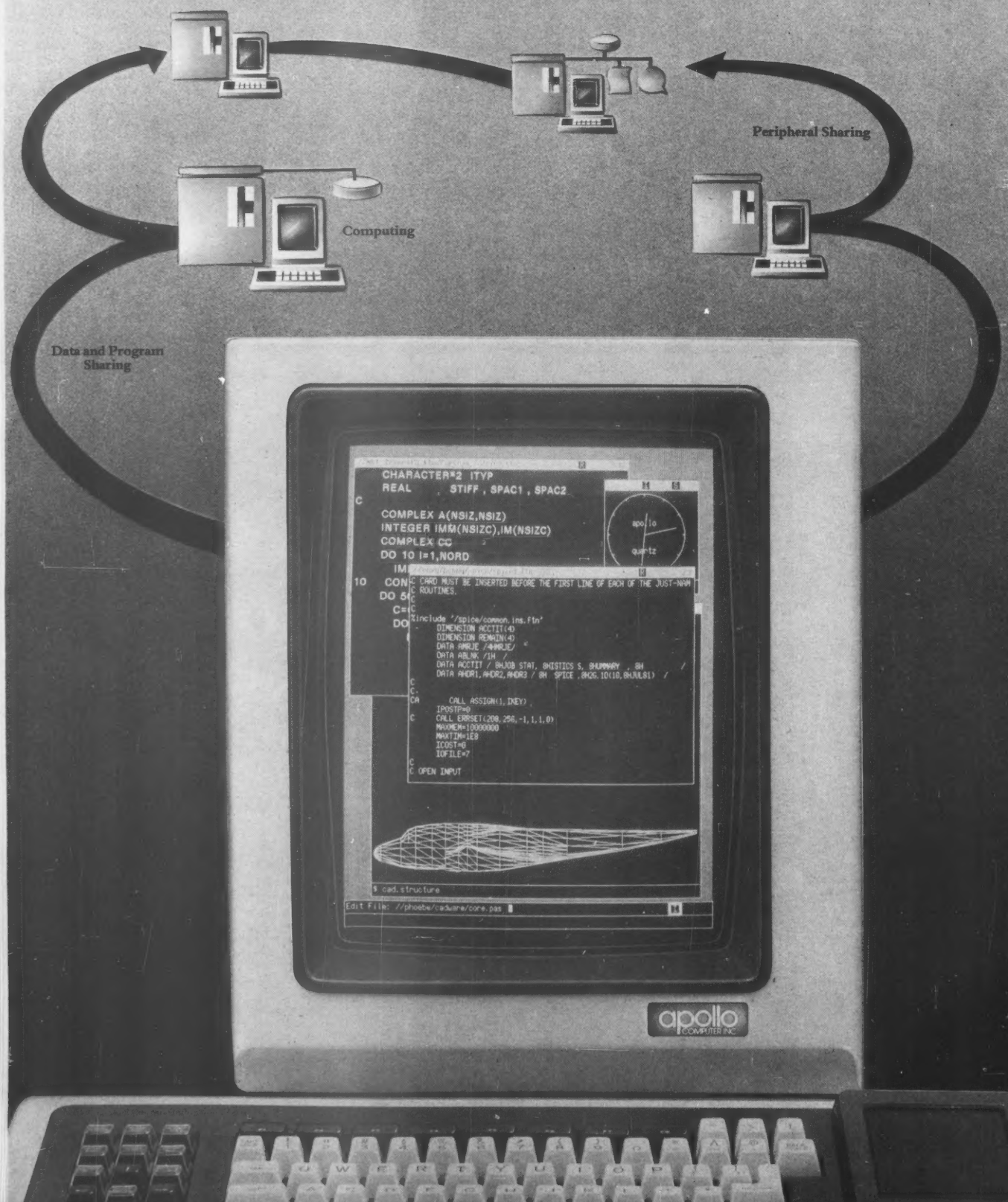

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Until now, there were only two ways to run your big and small jobs: on a massive batch mainframe, or on an interactive supermini.

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Now you have an alternative that is powerful, responsive, and that grows economically—Domain Processing.

Domain Processing provides three computing essentials:

Mainframe capabilities on every desk, so you can run big programs like finite element analysis;

High resolution graphics, and the computing power to support it, to let you do interactive design applications; and

A network that lets all the users share resources—data, peripherals, and software—automatically, at disc speeds, while running their programs, big or small, at the same time without affecting one another.

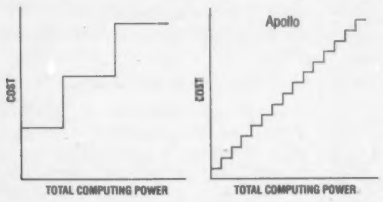
Processing Alternatives

	BATCH	TIMESHARING	DOMAIN PROCESSING
Type	Large mainframe (e.g. Cray)	32-bit supermini (e.g. VAX)	Networks of dedicated high performance computers (Only Apollo)
Typical Use	Very large computations	Interactive, real-time	Interactive and large-scale computations
Applications	Very heavy CPU-cycle applications	Multi-user, low to medium CPU cycle applications	Any number of users in heavy CPU-cycle graphics intensive applications
Typical Entry Cost	$3,000,000 to $8,000,000	$150,000–$300,000	$35,000–$50,000
Incremental processor cost	$3,000,000 to $8,000,000	$150,000–$300,000	$25,000–$50,000

TACKLES THE BIGGEST JOBS

Each user's Domain system node has a 32-bit processor, 16 Mbytes of virtual address space, and up to 3.5 Mbytes of high-speed physical memory. That means you can run very large, single-program applications such as NASTRAN, circuit design simulations, architectural/electrical construction applications and many others. Or, with Domain's inter-process communications, you can run multiple program applications. Or, you can configure an entire network for running in a distributed multiprocessing way.

Growth Costs



Domain Processing reduces your initial system cost by allowing you to install only the computing power you need. Larger systems typically force you to buy expensive and wasteful excess capacity. A Domain Processing network is expanded in cost effective, manageable increments. With a large system, expansion usually means adding another expensive processor.

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Domain Processing's high resolution, bit-mapped displays drive your multiple windows into different, concurrent processes—as if you were working at your desk with sheets of paper. You can move these windows anywhere, make them any size, and overlay them in whole or in part. Domain system users typically have two or three processes active, although they can display up to fifteen. You also have a choice of a vertically oriented, 15-inch display or a horizontally oriented 19-inch display, so you can work in the format that fits your application.

memory operating system is geared to support Domain Processing's multi-level interaction. And a growing library of third party software can provide the support for your scientific, engineering, modeling, CAD/CAM, and decision support applications.

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Domain system users are part of a computing community, yet they never lose what matters most—big computer performance. A CPU-intensive job that bogs down your timesharing system, or, worse, eventually increases response time so much you have to buy another supermini, runs on one Domain node. And yet a job requiring resource sharing can use all network facilities—memory, CPU power, mass storage, data and programs, peripherals —transparently, as if they are local.

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In most multiuser systems, response time declines as the number of users increases. In Domain Processing, each user gets a consistently high level of performance dedicated to his job.

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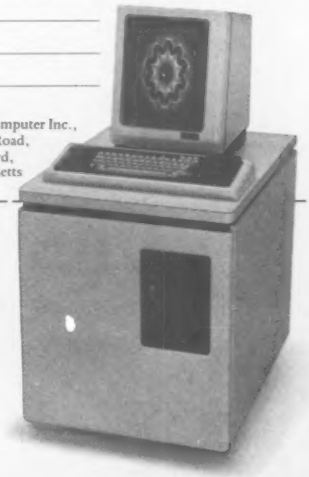

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Study Finds Fault With Program Specifications

(Continued from SR/22)

tion survey. Analysis of the first 91 responses has not been very encouraging. We are finding that most organizations are still struggling with the question of whether or not to hold walk-throughs.

When held, they come quite late in the development life cycle and usually suffer from the lack of standards and guidelines. The use of program prototypes to generate source programs is practically nonexistent. Selected questions and responses are summarized below:

A structured walk-through is a generic name given to a series of reviews of developer's work (design, code, documentation and so forth) by fellow project members, each with different objectives and each taking place at different times in the system development and maintenance cycle.

The data clearly shows that the use of walk-throughs is not very widespread. Only one-third of the surveyed organizations are using them routinely. When held, their use was inconsistent and infrequent. The fact that close to 33% of the walk-throughs have turned into stompons indicates that moderator (facilitator) training is lacking and walk-throughs are not well conducted. It is clear that both the DP management and staff have a low level of commitment to this powerful and necessary tool.

Program prototypes can be defined as predrawn (skeletal) diagrams of various standard program types and their respective skeletal source code. Programmers then use these prototypes (manual or interactive) as a basis for new program design.

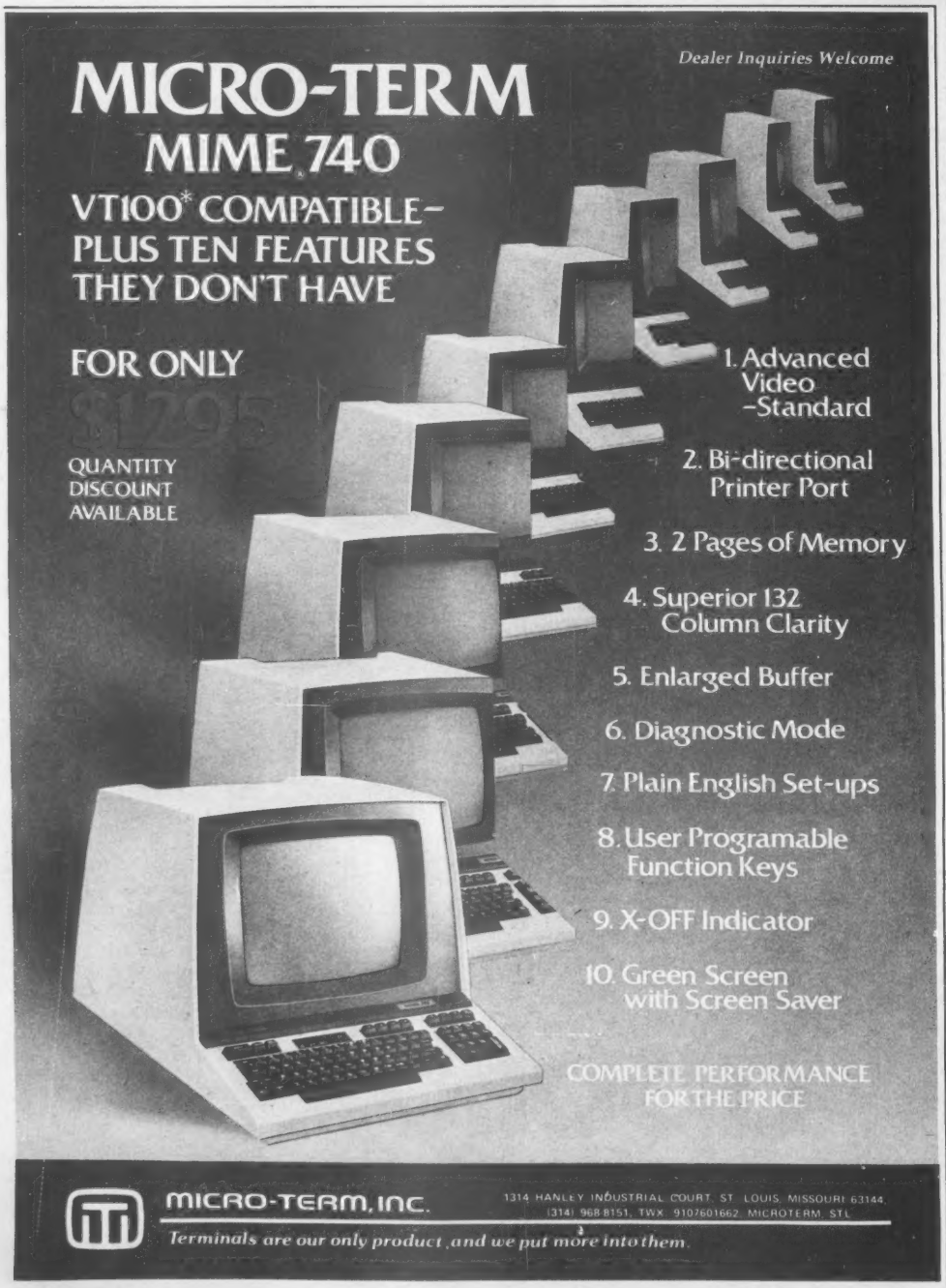
Standard Prototypes Needed

It is surprising to find that close to 25% of the respondents are not familiar with the concept of program prototypes. Of the 39 who have used prototypes, 25 responses are from users of CICS-based routines. Only nine firms (less than 10%) are using program prototypes. The remaining five "yes" responses are from programmers who have developed prototypes for their personal use. Of the 26 firms that have prototypes available, regretfully only 19 require their programmers to use them.

The data processing industry needs to build software the way the electronics and hardware industries build hardware — from standard preconstructed prototypes (standard logic diagrams, program shells, I/O modules). Prototypes help eliminate logic driver and logic path errors, generate close to 60% of program source code, produce standardized programs and help reduce the maintenance effort by over 70%.

Unfortunately, the message hasn't yet reached the ears of DP management. Management is still wasting its time arguing whether lines of debugged source code written per day is a good measure of productivity and, continuing with this dim approach, whether comments should be counted as part of programmer productivity. This is as absurd as asking an engineer, "How may linear feet of lines have you drawn today?"

Kapur is president of Kapur & Associates, Inc., a consulting firm located in Danville, Calif.



Involve 'Soft S's' In Management

(Continued from SR/23)

move to higher levels of performance.

What he has learned is that high performers are trained, not born. They have developed specific, learnable skills. What gets in the way and creates a barrier to performance is one's belief system — the capacity to believe that it is not possible.

Changing someone's belief pattern is the challenge. How can this be done within an organization's DP department to assure higher productivity?

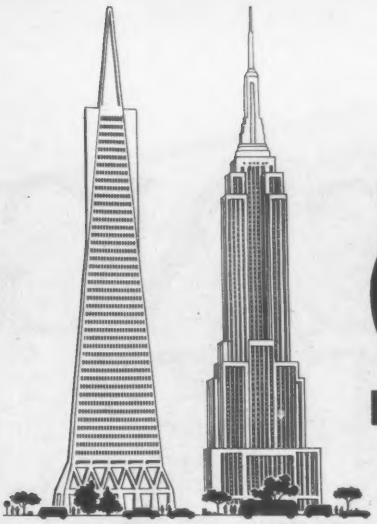
Increasing Performance

For a major increase in performance, Garfield asserted that the skills that must be acquired are:

- Working smarter, not longer.
- Motivating oneself not only for the short term, but for the long haul as well.
- Good health, good relationships.
- Stress reduction. Finding out at what levels we optimally operate and how we relate to anxiety and getting in touch with the state in which we perform best.
- Good rapport with fellow workers.

Many of these skills can be taught in the organization. Other employees must be committed to learning on their own. What is important is the awareness that these skills are obtainable and learnable.

Bensu is a human resource development consultant located in San Francisco.



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User-Driven System Boosts OA Productivity

By Jean K. Singer
And Thomas J. Thiel
Special to CW‡

PEORIA, Ill. — The technology of office automation is bringing widespread changes to many organizations, but all too often it does not achieve the anticipated productivity levels.

Snags can result from lack of initial, comprehensive and long-term strategies, user resistance to change, insufficient user training on both hardware and software, haphazard systems analysis, inadequate documentation, poor communication between users and computer staff or lack of manager support and visible commitment.

Since the objective of management has always been to apply technology to improve productivity, what are the means to avoid or overcome these pitfalls? Increased productivity can only happen in an integrated atmosphere of preparation, participation and practice.

At the Agricultural Research Service's North Central Regional Office (NCRO), U.S. Department of Agriculture (USDA), here, the computer has become the major tool for achieving functions in every organizational unit. Applications range from logging and retrieval of correspondence and sophisticated word processing to complex data processing and electronic transmission of information.

We believe our success in office automation is based on our system being user rather than computer staff-driven and, therefore, the NCRO users are highly motivated to use the computer to perform their daily work tasks.

Dynamic Systems

Systems must be compatible with the way people do their jobs. Any computer system is evolving, dynamic and subject to change, and the user will be the first to become aware of its deficiencies as well as its potentials for improvement or expansion. To maintain this dynamism, there must be an iterative process that intimately involves the users in the design of their own systems.

Even though productivity had been greatly increased at the regional office, there was a need to provide better direct and indirect service to our managers and scientists in the 12-state north central region to facilitate joint planning, evaluating and reporting of research. To accomplish this, we installed remote terminals at seven of our area and center locations. The training was the key factor in the automation process.

Our training approach included the development of detailed training materials coupled with hands-on experience. More importantly, we developed a unique data base designed only for training. This approach eliminated the hazards and fears of learning on the actual data bases.

An overall training plan developed involved the use of committees at three organizational levels:

- Key decision makers to oversee the entire effort by setting policy, establishing objectives and setting priorities.
- Key line managers to decide procedural issues from an organizational perspective and to coordinate cross-functional impacts.
- Ad hoc groups as needed to advise on specific systems, procedures, transitions, functions and security needs.

Careful planning and preparation is important, but establishing clearly defined, limited and phased-in objectives is essential. We decided on a three-phase approach for bringing computer capabilities to our dispersed area/centers:

- Provide extensive retrieval capabilities of information on existing major NCRO computer bases.
- Reduce the paper flow through the use of capability to update data files remotely.
- Define and implement new or enhanced capabilities to meet specific or special needs at each location through systems analysis and user involvement and commitment.

Training workshops were held in the fall of 1981 to implement the first phase of the plan. About 20 persons from both management and operational levels attended each of the three-day workshops.

Training Workshop

Three aspects of the workshop were particularly important; the first was teaching computer basics.

A second important factor in the training was the distribution of the user's manual. If users do not know what they have or how to access it, and cannot find out easily, increased productivity is doomed. A user's manual was developed that was user-friendly — written with no computer jargon. The manual was arranged in the same numerical order as the programs were accessed on the menu, color-coded and page-numbered uniquely to ensure that the page number was linked to the program number on the menu.

Hands-on training was a third factor in the training process. This was divided into three segments: use of training data, which helped to prevent the user from being intimidated by the "big electronic box" and to lessen their initial fear of inadvertantly destroying real data; use of a program generator and a report writer; and use of real data that gave the user an overview of concepts and functions of the available systems.

The training sessions were not allowed to drag. A terminal was provided for each one to two persons so that students could experiment with the terminals and programs. The training data was accessed through specially developed programs that encompassed all the features that would be encountered in any of the actual data programs.

The intial data file consisted of 50 records (101 bytes each). Each record contained a fictitious business owner's name (which was a humorous take-off on the participants' names), location, business products (unusual and silly commodities) and various other fields.

The participants learned how to read, show, add, change and delete records; do key word retrieval through the use of AND/OR logic; and select specific records for printing using EQUAL/NOT EQUAL comparisons.

Participants were allowed to create their own screens and write update programs, enter data and write programs to print reports. This part of the workshop went a long way in removing the veil of mystery that seems to hang over computers and shroud effective interaction between users and computer staff.

Singer is a computer specialist and Thiel is a program analyst, program planning and review, in the North Central Regional Office of the U.S. Department of Agriculture's Agricultural Research Service.

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Allow Program Flexibility

Subroutines Curb Repetition in Business DP

By Brian G. Merrill
Special to CW‡

Subroutines have been used by some segments of the data processing profession since the early days of computers. Scientific and engineering programming utilizes subroutines for special formulas and calculations, while operating system programs often make heavy use of them.

Business programs, on the other hand, rarely use subroutines in most data processing installations. It is possible to review the application programs and never find a call to a subroutine, even though these programs often contain similar routines.

Unfortunately, while these routines perform the same functions, they are often coded differently, have not been maintained concurrently and in some cases do not even produce the same results.

Engineering applications use subroutines to handle the complex and recurring formulas and processing required to design everything from buildings to electronic circuitry. Systems programs are characteristically divided into subroutines because of the various and complex tasks that are required. Many of the scientific functions, such as the trigonometric, matrix manipulations and common transformations, are now standardized into commercially produced packages.

IBM's SSP

One such package is the Scientific Subroutine Package (SSP) available from IBM. This package is generally well-documented and tested and has been widely accepted by the scientific programmers. The subroutines also allow programmers to code mainline programs that rely heavily on calls to packaged subroutines.

Subroutine concepts are used extensively in assembler programming and are very common in software systems products, such as operating systems, data base management systems and communications systems. These systems are generally very large and complex and the development requires teams composed of analysts, designers and programmers.

Because the processing is extremely interrelated, the various functions must be defined in detail and the interfaces between the various routines must be specified before the major programming effort begins.

An additional consideration for subroutines within operating systems is the idea of developing independent software subroutines for each hardware device. In this way, subroutines can be put together as required by computer hardware configurations, thus allowing flexibility for the entire computer system to become modular.

Despite the subroutine's success in scientific, engineering and systems programming, subroutines are rarely used in business programming. One of the reasons for this may be Cobol, the major language used in business. The PERFORM verb in Cobol allows the programmer to develop code that can be executed from different locations within the program. In other languages the PERFORM concept is either not available or is very cumbersome and difficult to use.

The subroutine concept is seldom taught to beginning Cobol programmers due to the existence of the PERFORM verb. This technique is therefore rarely used. This need not be the case, however, since the use of subroutines can help to eliminate the need for recording certain routines that are used repeatedly.

With the increased acceptance of structured programming techniques and top-down development, the use of subroutines has become more and more of a possibility in business applications.

With top-down techniques, programs are designed more thoroughly before they are coded. Much of this program design is done by either the analysts or the program designers, rather than the programmers.

By designing the programs through the use of structure charts, similar routines can be identified in reviews and walk-throughs of the program design and these routines marked as candidates for development as subroutines. The routines chosen are coded as subroutines and tested and thereafter used whenever needed rather than recoded and retested over and over.

The actual implementation of subroutines by a data processing installation can be done in a variety of methods. The coded source subroutines could be included within a program's source and compiled as part

(Continued on SR/32)

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DP managers learn people-managing skills at the "Executive Challenge."

Camp for DP Managers Builds Management Skills In the Great Outdoors

By Anton T. Lahnston
Special to CW‡

PETERBOROUGH, N.H. — Imagine a group of DP managers using a topographical map, two compasses and 800 acres of woods and streams to deal with the issue of people productivity. Picture the same group building a raft out of barrels, ropes and logs to get themselves across a river.

While these exercises may seem more relevant to a camping trip than to better management, Boston University's Sargent Camp here has found that even DP managers can learn to manage people resources by experimenting in a natural setting.

For instance, a management team from a Massachusetts computer manufacturing corporation came to the "Executive Challenge" program last summer for three days to learn team building from the university's School of Management staff; they improved their people productivity. The group participated in a variety of outdoor problem-solving activities from rope climbing to river crossing that would later be discussed and compared to the managerial workings of their office.

With the help of staff consultants, the managers learned how their behavior in crossing a river might translate into working out DP problems. Communication, leadership ability, interpersonal relationships and risk-taking were some of the topics discussed with the staff and, as a result, the individuals were more willing to confront problems that existed within the group.

Further activities focused on group interaction, time management and team building. Barriers broke down to the point where new levels of communication were reached and a spirit of openness prevailed.

Outdoor exercises headline productivity sessions.

In the evenings the managers address the goals they had set for themselves at the outset of the programs. Members realized that they had to create a specific strategy to prevent falling back into the same problems. It was decided that a forum would be established to allow members to air their concerns without repercussions. Leadership in the forum would not necessarily be based on the traditional level of authority.

The task of establishing a forum was no easier for this group than it is for any DP department to do for its programmers. But a great deal was accomplished in the creation of the forum. Changes in behavior helped people to communicate more effectively, individuals could confront one another and listen without side effects, and individuals spoke about commitment to the office while discussing guidelines and procedures for the forum.

When the exercises were over, members talked openly about daily work problems and sought resolutions. One important decision made was that training and teacher/student relationships were a vital part of increasing people productivity.

Upon returning to their office, the forum met and applied the interpersonal and management skills learned at the camp to their day-to-day work. Six months later, the forum, having served its purpose, was disbanded. The members now feel comfortable solving problems within the traditional organizational structure.

The outside observer may wonder why many of the issues and problems could not have been addressed directly at the work place. It is our belief that the barriers at work need to be reduced first with outdoor, physical activity.

Lahnston is the director of Boston University's Executive Challenge in Peterborough, N.H. During the past four years, 2,500 managers and supervisors have participated in the program.

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Subroutines Fit Business Uses

(Continued from SR/31)

of it. The subroutine could be compiled separately, stored in object format and then included in the collection of the object modules at the time the executable module is created. Depending on the size and use of the subroutines, it may be advisable to use some routines in their source format while using others in their object format.

In any application project the modules that are repeated, and thus are possible subroutines, depend on the application. A few of the obvious candidates are date routines, check digit routines and data validation routines.

Merrill is an associate with the data processing consulting firm of Kieffer, Martino and Associates, Inc. located in Cheektowago, N.Y.

'Poses Daily Conflict'

DP: The Throughput vs. Turnaround Paradox

By Ross Rumore
Special to CW‡

Despite advances in DP technology, no one has been able to develop one machine that can successfully handle two types of processing — scheduled commercial work and scientific/engineering work. This poses a daily conflict for many computer center managers.

The conflict arises because of the differences in running a throughput computer center vs. a turnaround center. Throughput is the processing of large volumes of scheduled commercial work such as accounting or data management.

Turnaround is the provision of a high level of responsiveness to the iterative computing process such as that required by the scientific and engineering segment of an organization.

Choosing Processing Methods

Choosing between the iterative (or turnaround) computing processing and the scheduled (or throughput) processing presents a major dilemma for senior management who must arbitrate the use of the computer facilities. The problem becomes even more frustrating when management is faced with the frequently asked questions: "With all the investments we have in computing, why can't engineering get turnaround? Why must we buy a separate machine or spend money on the outside for turnaround service?"

General data processing, accounting and data management are usually the bases on which all computer installations are cost-justified. The profile of this throughput work is typified by large amounts of data, small actual computational requirements and extensive formatted output.

In addition, this work is usually on a daily schedule. That is, payroll has a deadline and cutoff, all scheduled in advance. The same holds true for all general accounting. It is run on a schedule.

Given this profile of a typical throughput work load that represents the major segment of the computer hardware sales market, it is not difficult to understand that for hardware manufacturers to remain competitive, they must design their hardware and operating systems for optimum utilization in this area.

Thus, the argument for the throughput machine maintains that in any given period of time, as much work as possible must be processed. At the same time, all hardware components must be utilized to their fullest so that there is little or no idle time for which the customer is paying rent.

Turnaround Work Profile

Now let's take this same computer complex, so well designed for its throughput processing that it even has some spare capacity for the same type of work load. On it, we overlay turnaround processing, which has a totally different profile:

- Large-core resources vs. demand storage resources.
- High-accuracy requirements reaching into the ranges of scientific notation.
- Scheduling not required; work must be run on demand with little or no notice.
- The fastest turnaround possible from job submission to output returned.

This turnaround work profile fits computers designed for it, not computers designed for throughput processing.

Turnaround processing needs results because most scientific and engineering work is an iterative process. Run a problem, look at the results, correct the assumption and run it again until the desired results are obtained.

This iterative process usually means that while the computer is processing the problem, the engineer or programmer is in a "wait state" since he cannot proceed without obtaining the results. The longer the wait state, the more productivity is reduced and the bigger the cost of the total job.

This is, in fact, the trade-off for using a turnaround system. The turnaround system may be somewhat less efficient in using all the resources all the time, but the penalty is small when compared to having staff idle, waiting for output.

Many hardware manufacturers have tried to develop hardware and operating systems that can accommodate the mixing of both throughput and turnaround processing so that the customer won't have to overinvest.

(Continued on SR/34)

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Hardest Part of Developing Productivity

By Richard J. Streebel Jr.
Special to CW‡

The method you choose to increase productivity is not as important as is the careful development of a specific plan of attack.

The first step in developing a specific plan is to select a qualified individual to lead the productivity effort. This person can then become a focal point for all productivity activities. When developing a productivity plan, the most difficult problem is balancing the plan across the organization. Targeting only the technical staff is perhaps the most common mistake. It is analogous to having a car on which one wheel can go 100 miles per hour and the other three are restricted to 10 miles per hour.

Before looking at each specific area, let us take a look at a general approach to increasing productivity for any target group.

Most organizations have the potential to achieve significant productivity increases without making substantial cash outlays for the latest product. This occurs in two areas — education and tools already available within the organization.

Education in productivity is necessary to get people thinking about better ways of doing things. They must be convinced that improvements are possible and will benefit them.

At first, these ideas may need to be coaxed and nurtured until they grow. Once grown, they will have to be controlled to prevent conflicts and movement in inappropriate directions. At this point, productivity improvements can become virtually self-sustaining.

Using Available Tools

The other side of starting an improved productivity program is using tools already available within the organization. Over the years, most DP organizations acquire numerous productivity tools, some of which may not even be recognized as such. Most of these take the form of software products that were originally introduced for specific projects or brought in by a new employee. Many were never made generally available, while others fell into disuse when the "expert" left.

Identifying and reintroducing those software tools that still have value can be the source of significant productivity gains. By increasing staff awareness through documentation and training, these items provide a low-cost source of tools. How often have we heard, "Why didn't someone tell me we had that?" Every time we hear this, it is indicative of a lost gain in productivity.

Management may be the most diffi-

The Throughput vs. Turnaround Paradox

(Continued from SR/33)

With all our DP technology, no one has been able to develop a machine that can successfully handle both types of processing. This is the daily conflict and why many computer center managers have difficulty satisfying the engineering requirements and merging them with the ongoing, well-scheduled commercial applications.

Understanding the differences between the work to be done and the configuration of the computer complex can better help a manager to resolve problems resulting from the turnaround vs. throughput paradox.

Companies generally can best satisfy the throughput and turnaround requirements only if separate computers are used, each configured for its specific task.

Unless an organization has absolutely unlimited resources and can afford to have an idle computer on standby for its turnaround work, the two types of processing can never coexist within the same computer and also keep the aggravation factor within acceptable limits for the users.

One Successful Method

One successful method that is used by many companies is an outside service specializing in turnaround processing and also providing fully supported applications packages that can be used on demand. Thus, the organization structured for the throughput user is relieved of the burden of turnaround software and support.

The major advantages of this method of solving the paradox are that the internal DP workload is not interrupted. It can continue on the processor best suited for its configuration. Meanwhile, the turnaround user receives the service required on a processor configured for the special scientific and engineering workload. Most importantly, the overall cost is less.

The next time the question of "Why can't we get turnaround?" arises, remember the throughput vs. turnaround paradox. A company specializing in turnaround and applications may be your answer.

Rumore is director of the Electric Power Industry Group at University Computing Co., Dallas, Texas.

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Strategies? Balancing Plan Across Staff

cult area to visualize as a place for productivity gains. First, take a look at managerial responsibilities. Managers move paper, talk to users, make assignments, monitor projects and motivate the technical staff. Productivity improvements can be made in all these areas.

Possible Solutions

Although the solutions will vary between organizations, possibilities include:

- Reducing paperwork by using microcomputers, electronic mail or adding a staff assistant.
- Establishing a skills inventory system to aid in matching people to the job. This could be either manual or automated.
- Implementing a development methodology that includes project monitoring and automate it as much as possible.
- Educating management through seminars, articles and casual discussion to seek out productive ideas for their staff. This part is critical to the entire productivity plan. The right management attitude will make or break your plan.

The technical staff often seems the easiest target for productivity gains. The "let's buy a solution" attitude seems to be the first reaction in this area. A good tool introduced improperly can be disastrous.

The proper preparation and training can make your staff use the new tool rather than view it with suspicion. On the other hand, an unseemly delay in implementing a tool the staff wants will also have a negative impact.

Technical Staff Productivity

There are a number of ways to improve productivity among the technical staff. Many will be unique to your organization. Consider these suggestions:

- Choose tools that are compatible with your organizational goals. There are a multitude of tools for every purpose you can imagine. The ones that are best for your organization is not only important, but difficult to determine.

The question here is not which product you use, but whether it can aid in achieving company goals. There is little point in investing in an expensive development aid if your organization purchases most of its software.

- Provide your technical staff with a consistent, easy-to-use means of testing.

Much time is wasted when test data must be recreated each time a small change is made. Running production data, a common test method, is also nonproductive. This type of test is usually much bigger than is needed, yet it contains an uncertainty factor with respect to how thorough the test was.

- Use common code to its full potential. By providing the proper tracking and documentation system and by fostering awareness among the staff, this technique can achieve spectacular results.
- Use a development methodology. Regardless of which one is used, it will result in productivity gains if used consistently throughout the organization.

This productivity gain occurs because communication between the staff becomes clearer, documentation becomes consistent and the feeling of environmental stability is enhanced.

Effective Methodology

To be effective, the methodology should include the proven techniques in structured analysis, design, programming and walkthroughs.

- Be sure to use standards and procedures that are kept current. They should also be critical to a project's success or a means of facilitating communication within the technical organization.
- Treat the technical staff as professionals by providing them with flexible working conditions and allowing them to experiment and innovate. It will be one of the best productivity aids you can implement.

'When developing a productivity plan, the most difficult problem is balancing the plan across the organization. Targeting only the technical staff is perhaps the most common mistake,' says Consultant Richard Streebel.

Designing and implementing a good productivity plan is not a quickly reached goal. It is a goal that must be continually reevaluated as your organization changes.

The plan will never be complete, but will be a series of milestones, each improving your DP productivity.

Streebel is a productivity consultant with Associates Bancorp, Inc. in South Bend, Ind.

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Software Development Standardized

Integrated Program Sparks Results for GE

PHILADELPHIA — When the national emphasis on productivity reached a crescendo several years ago, General Electric Co.'s Space Systems Division here had already begun addressing software development productivity. Today the division has an integrated program that recognizes and addresses the factors contributing to software productivity.

A divisionwide policy on software engineering and management was formalized early in 1979 to establish the groundwork for standardizing software development. The objective was, and the results have been, to produce higher quality software on time and within budget by the following methods:

- Establishing greater unity in the approach to software engineering and management.
- Identifying and cultivating the best techniques for performing software engineering and management.
- Capturing the best methods established at any division site for use at all sites.
- Using division-level directives to ensure effective local software engineering and management instructions.
- Measuring results through feedback from software development projects.

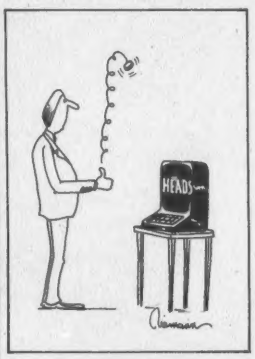
The productivity advantages accrued from these activities are reduced training time and reduced start-up time when moving from project to project and reduced cost in error correction by earlier detection through a series of strict reviews in the requirements and design phases.

Tools and Technology

Automation has been a key to productivity gains in most industries, so why not software development? The Software Development Environment (SDE) being implemented by GE's Space Systems Division is just that — automation of software development. The SDE consists of an integrated set of software tools to support all phases of software development — from concept through maintenance.

The tools include program design languages, library control software, simulation tools, test procedure languages, configuration management and automated flowcharts and documentation, as well as the standard

(Continued on SR/40)



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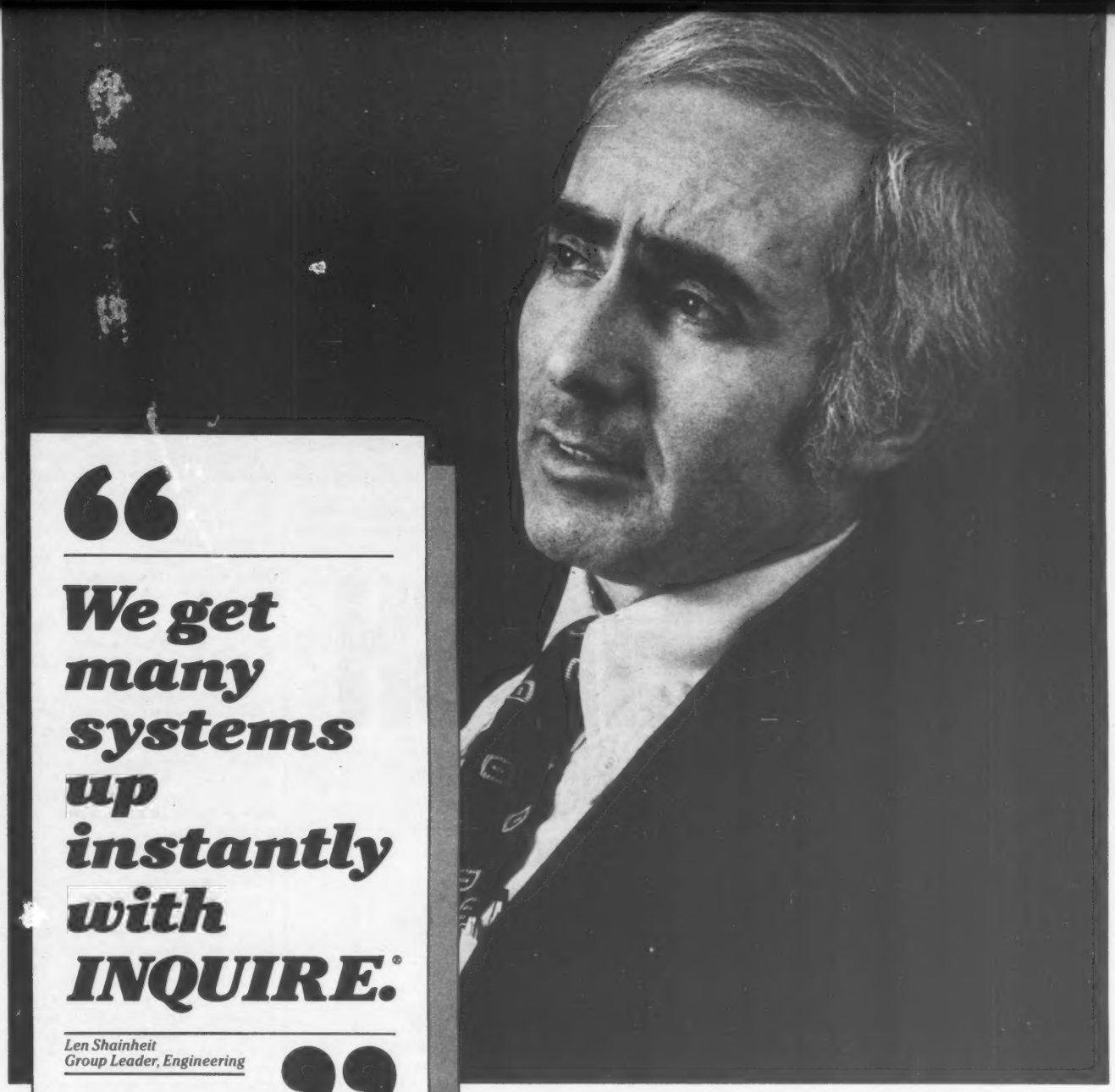

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Productivity Program Gets Results for Space Division

(Continued from SR/38)

compilers, editors, loaders and code analyzers. The tools implemented in the SDE are selected from three sources: internal GE components, commercial software vendors and the public domain.

A prototype subset of tools is currently being used and evaluated on a small number of projects to determine effectiveness in improving productivity.

The anticipated productivity gains are:

- Having to learn only one system for all projects, thereby reducing start-up and training time and allowing the transfer of work, not people.
- Getting new hires up to speed faster.
- Allowing the developer to execute the work cycle faster and reduce the number of iterations through the work cycle.

Education and Training

Activities ranging from in-house seminars to cooperative degree-granting programs are elements of the education and training program. The productivity objectives of this program are to:

- Orient employees in the discipline of software engineering to institutionalize standard methods and practices.
- Attain and maintain competencies in new problem-solving and technical skills to ensure their most effective and productive use.
- Motivate employees.

In-house seminar programs feature professionals in data systems engineering at GE facilities. The seminars provide an opportunity for employees to learn about and question the theories of those who are leading the state of the art in data systems engineering.

There is also a cooperative degree-granting program on a tuition-reimbursement basis that leads to an M.S. degree in computer science or electrical engineering.

Attention to the human resource factors of software developers completes the picture in GE Space Systems Division's software development productivity program. A job diagnostic survey has been established to provide insight into effective management and motivation of computer professionals. The program develops competency models for superior performers in software engineering. These activities are aimed at providing the most conducive environment with respect to job assignment, human interaction and personal development for productivity enhancements.

Aside from the standard effectiveness surveys and questionnaires, GE's Space Systems Division employs automatic data collection and analysis to determine productivity gains. A Statistical Collection and Reporting System (Scars) collects actual manpower data associated with software projects and correlates the data with specific phases of the development process.

With the introduction of new productivity enhancement tools, techniques and methods and a comparison with past manpower statistics, GE's Space System Division will measure actual productivity impacts.

A tool utilization monitor will be incorporated into the SDE to determine the usage of each tool. This utilization data will be analyzed in conjunction with Scars data to ascertain the level of effort required on software projects and the differences in effort based on the degree of tool utilization.

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Finally, our June 14th NCC Wrap-Up Issue will have complete coverage of all that happened, prepared by our 35-person editorial staff. You'll read who said what, who introduced what and how it works, and review the show's features and highlights in words and pictures. Black and white ad close is June 4th. Color close is May 28th.

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For When Things Go Too Well

An Inverted Guide to Smooth-Running Projects

By Richard Bollinger
Special to CW‡

After months of developing an application, the program finally comes down the pike on schedule, pleasing to the end user and a genuine booster of programmer morale.

While DPers often dream of such an occurrence, the prospect of a smooth-running project may have an unsettling effect on the DP department.

To avoid the queasy feeling of having too many things go too well too often, I have devised a list of tactics to resort to when things appear to be right on target. If followed, these techniques will result in decreased productivity, a situation with which we are all familiarly comfortable.

Development Resources

Do not provide appropriate software tools. In an on-line environment, do not provide interactive debugging aids. If possible, try to get by with just the file system, an editor and the compiler.

What development aids are planned, do not purchase. Develop them as a part of the project. This increases the number of modules that might be in error when a bug cannot be readily found.

Do not document these development aids. Let project personnel discover how to use them by trial and error.

Do not publish news about changes in the development environment. Transmit this information by word of mouth. This discourages project personnel from taking vacations.

Do not provide labor-saving resources such as program skeletons, common subroutines or source-code libraries. Have all programs built from scratch with few similarities in style.

Never assign responsibility for any of the development resources. Leave maintenance in the public domain.

Use system facilities that require centralized development of one part (for example, CRT screen template definitions) and decentralized development of another part (for example, related on-line applications programs). This way a change in the decentralized part, even a minor one, must wait on the order of 24 hours for the associated change in the centralized part.

Provide unreliable resources. If possible, have them get worse as the work load increases. For example, arrange to have one or two disk failures per week near the end of the project.

If possible, have any terminals used for development be extremely sensitive to static electricity. Make sure that the testing environment differs in some way from the production environment.

In a project that involves interactive access to the computer via dial-up facilities, assign testing duty to the telephone lines reserved for the use of project personnel.

Do not use virtual memory, or if you are forced to use it, do not take full advantage of it. Challenge project personnel with regions, partitions, memory overlay structures and program segmentation.

Do not use program version numbers or other schemes to keep track of module versions in testing or production. This way you are never sure what is being debugged or if the bug exists in a module that has already been fixed.

Have a marketing person decide the functional scope of the product the project is to develop.

Assign a technically oriented person with very little management experience to head the project.

When this person gets the project into trouble, demote him and assign a person from marketing to lead the project.

When developing applications software, always experiment with new hardware or systems software or both.

Whenever possible, arrange to sacrifice people time to conserve computer time.

Schedule all parts of the project under development to be at the same stage of development at the same time. This way everyone competes for the same scarce resources at crucial times.

Be sure to have one or two critical people who, by virtue of special knowledge, can only perform some task crucial to the project. This way all other project personnel can wait until it is completed.

Change Major Aspects

Halfway through the project, change some major aspect of the product: performance, accuracy, functionality, development time and so on.

Consider reliability and security anew. Have the "senior" project personnel decide on programming standards (but continue to accept any code that appears to work).

Near the end of the project, reestimate the man-hours needed to complete the project (an additional 50% will do). Cancel all vacations and go to 60-hour workweeks.

Check the test data from the user and discover that it differs from the original specifications. Keep moving sliding deadlines at the last minute so people feel stupid working overtime to meet them.

Have the users of the system describe in their own jargon what they want, scratch it down, type it and hand it out to the programmers as the specifications.

Provide a data base subsystem and then take advantage of it. Encourage the mixing of record types as done in batch and card-based systems (for example, mix detail, header and trailer records). Design the data base first, then design the screen templates, reports and programs.

Get the specifications from someone who thinks he knows what the user needs. Do not consult the user until the end of the project, causing half of the code to be rewritten.

Always give programmers the fifth copy of the specifications. Make sure that all programmers need to know all the details of the computer system to get any kind of service from it.

Make sure that the data design contains many variations of keys and identification that are similar in meaning, but different in expression, or similar in name, but different in meaning.

Bollinger is the owner of Arbor Computer Systems of Ann Arbor, Mich. He has been filing these pointers away for some years now in the hope that they will be ignored.

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HOUSTON — An investment banking and securities brokerage firm here found that its highly paid financial planners were spending too much time manually grinding out routine calculations. By designing a computer-based financial planning system with a software tool, the productivity of Rotan Mosle, Inc.'s professional staff has doubled.

Rotan Mosle offers many investment services, one of which is financial planning. The firm counsels people of substantial wealth — top executives of major companies, owners of successful businesses and heirs of large estates — through a program of comprehensive financial planning designed to increase their personal wealth, achieve financial independence and conserve estate assets.

The first full year that Rotan Mosle offered comprehensive financial planning (1980), more than 40 individuals representing approximately $100 million of personal net worth became clients of the service. The planning process provides a systematic organization, analysis and review of an individual's financial situation, culminating in a written five-year plan consistent with the client's objectives and temperament.

David Litle, vice-president of financial planning for Rotan Mosle, explained the limitations placed on the full range of the company's services under the manual system: "Seventy-five percent of my staff's time was spent on routine calculations — adding columns, formatting reports and doing tax calculations. Only 25% of their time was spent on the most productive aspects of their job — creative thinking, creative analysis and coming up with solutions. This was a very inefficient use of their time.

"The financial planning department's service of producing five-year plans was particularly slowed by the limitations of the manual system. There are almost unlimited variables, and many changes come up at any point in the process," Litle explained.

"After compiling the income tax reports, a client may have a special tax need such as a newly created long-term capital gain. Then the planner has to start from scratch again. The manual system was far too time-consuming and the profit margin was too slow," Litle said.

Reversing Percentages

"Now that our system is computerized, the percentages are reversed. Planners spend 25% of their time on those routine calculations and 75% on analysis," he explained.

Design of the new system began in mid-August 1980. The computer hardware, an IBM 4331 Group 2 processor, was installed by the end of the month.

The system uses a mixture of eight 3310 and 3370 disk drives, 25 production terminals and six test terminals. The operating system is IBM's DOS/VSE. Mark IV and Informatics, Inc.'s Trans IV, Cobol and CICS are used for programming. Two remote lines are operated — one to the downtown Houston office and one to Dallas. Rotan Mosle chose Trans IV as the interactive applications development tool to aid with programming and the program was completed by the end of November.

Program Developer's Viewpoint

Julie Borden, the senior analyst who headed the installation of the computer system, explained the benefits of Trans IV from the program developer's point of view: "Trans IV requires one-tenth as much time to formulate a transaction as standard CICS/Cobol or CICS/PL/I. The same transactions that could take weeks using Cobol or PL/I can be accomplished in 10 minutes with Trans IV.

"Financial transactions are complex, but using the CICS approach takes five to 10 times longer than Trans IV. In addition, it takes more experience to program in Cobol, whereas training in Trans IV is quicker, and a programmer does not require CICS expertise," Borden said.

"With Trans IV, easy error-correction shortens development time. Once the source of the error is discovered, correction can take as little as 15 minutes. With Cobol, it would normally take a day or two to correct the same error," Borden explained.

Once the Trans IV system was in operation, the financial planners (end users) found that it was not necessary to know a lot about computers. The screens are conceptual-specific. Once the user knows what he wants, he can bring information to the screen — and with the use of financial-planning terminology rather than computerese.

"The system was set up so that every detail ever handled manually is included in the system. A planner never has to sacrifice any aspect of planning that couldn't be accommodated manually," Litle said.

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A Question of Attitude

Only by Expecting 100% Will You Get It

By Cynthia Casentini
Special to CW‡

While attending a seminar on DP operations management in Denver last spring, I earned the onerous title of "Ms. 100%." This less-than-gentle nickname was bestowed for the heinous crime of expecting 100% productivity from the DP shop . . . and claiming to have achieved close to that level of efficiency.

From the boos and catcalls accompanying this "honor," it was apparent the sacred taboos that have been held in reverence from the throes of the first seven days of computer creation had been violated.

Having entered DP from the world of accounting (you know, where everything balances and the results are audited), I had no idea of the sacred precepts that govern nonproductivity in some established shops. Who would have thought reruns were holy? Who would have dreamed it was against the rules to bring a project in on time, within budget?

I didn't know procrastination was the rule when it came to documentation. I was unaware that only acronyms, abbreviations and buzzwords were to be spoken once our computer was installed.

As a "demanding user" of varied service bureaus for 10 years and after a hop over the fence to the other side as developer and manager of an in-house data processing operation, I have learned from experience these attitudes about productivity prevail.

Preserving Status Quo

There is an obvious attitude in many DP shops that preserves the status quo of low productivity and a minimal quality of production. It is the attitude that the best a shop can be is 65% efficient. This level is considered realistic, even by those learned leaders of seminars that are held to improve productivity.

What is considered totally unrealistic is the expectation of anything approaching 100% efficiency in all areas.

At the time we at Hayward Lumber Co. of Salinas, Calif., made the decision to become an in-house data center, we made several accompanying decisions relative to the quality of the operations of the new department. We had learned our lessons well from our years of observing mediocre management and production. We were determined not to fall into the bad habits and low expectations of the installations with which we had dealt.

The highest priority of establishing an efficient, high-productivity shop was the realization by management that nothing less would be accepted. Our methods of implementation were probably not unique, but our attitude was.

Problems do multiply with the size and complexity of the installation. Sheer volume of production and number of employees will decrease the likelihood of attaining the 100% figure. However, "size" is the most convenient excuse from the bottomless DP excuse barrel — and one that can be overcome with concerned management and employees.

When we converted to an in-house Datapoint Corp. system, 100% became our goal. This was the norm of the other operations within the company, and it also became our norm. Some examples that would support my claim of being close to 100% productive would be the ground rules upon which the DP department was built.

"Correct data, run on schedule" was not to be the exception but the rule. We made serious commitments to various users regarding turnaround time for month-end processing and have yet to miss that mark. We are frequently ahead of schedule, never behind — even when occasional hardware problems occur that entail some downtime or switching resources.

Applications software did not accompany the original installation, and because we wanted customized software we contracted with a software house for all our needs. The standards and controls are stringent, but the results are well worth the extra effort. We have totally user-friendly key-in screens, output that is "clean" (no edit runs) and data that is processed correctly the first time (no reruns).

Users are included in systems design and in authorization of applications. Payments for new systems were made by progress stages, and the final payment was not made until documentation was received.

Training for data processing personnel, non-DP management and us-

(Continued on SR/45)

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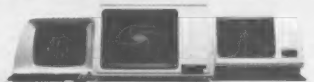

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Citing Good Performance Boosts Productivity

By Eileen Kelly Aranda
Special to CW‡

There are many good bottom-line reasons for organizations to care about their people and to improve their efforts at understanding good performance, involving employees in work issue and recognizing good performance. Both employees and the organization will benefit from increased employee commitment to the job.

If this renewed interest in the contribution that human resources can make to productivity is not developed, the implications for the U.S. economy are dire. We need the ideas and efforts of our workers — we need to care about our people.

The typical American worker is fast becoming what is called a "knowledge worker." DP professionals are one of the key groups of knowledge workers — employees upon whose judgment management depends for good performance. The knowledge workers' duties revolve around decision making and, as such, the traditional approaches for improving productivity (time and motion plus quality control) are less appropriate.

It is difficult to force more work or enforce quality standards upon knowledge workers. For improving their productivity, the organization is dependent upon their willingness to do a good job and develop improved methods of operation. The key to improved productivity from the knowledge worker (the largest segment of our work force) then becomes commitment.

From research and experience come insights into developing commitment among employees. Three essential ingredients important to organizations today are: 1) understanding good performance, 2) involving employees in work issues and 3) recognizing good performance. If organizations want to maximize the potential of their human resources, they must begin to develop programs and methods that will provide for these key ingredients.

Understanding Good Performance

Understanding good performance begins with knowing the elements of the job. What are the critical things that an employee must do? After determining what the employee must do, careful consideration needs to be given to how that work should be accomplished. Good performance is comprised of both what and how work is done — end results and process.

Next comes a need to understand the different levels of performing that job. Most supervisors and managers have general notions about what good performance is, but they have been reluctant to give specific examples and feedback on that performance. Yet we know that people are much more likely to attempt or accomplish what we want them to do if they receive clear job expectations.

A requirement, then, for improving good performance within the organization is to translate vague notions of what good performance is into workable guidelines for performance.

If employees are unsure of what good performance is, it is much riskier to perform because there is no assurance that the work being done is correct.

Employee Involvement

The employee is an essential resource for productivity improvement. Not only does the employee have the information necessary for developing improvements, but it is usually the employee who needs to be willing to implement those improvements. The most obvious response to this need for employee information is simply to ask for it. Obvious perhaps, but quite difficult to accomplish in most organizations.

Organizational hierarchy determines that most decisions are made well away from the work force. It is much easier and normal for information to be passed down in the organization than for it to be drawn up.

In addition to structural problems there are personal communication problems that keep employee information inaccessible. Most supervisors are not trained to discuss good performance or work improvements with their employees.

When considering methods for employee involvement, the organization needs to be sure the method chosen matches both the climate and and needs of the organization. There is no universal way to improve worker involvement. The organization must consider what it wants to have happen and what kind of participatory environment they currently have before they select an involvement program.

In many organizations there are no rewards for working hard or performing well. The organization needs to make it matter to perform well. Employees will repeat good

(Continued on SR/45)

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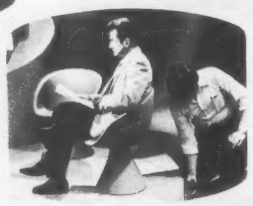

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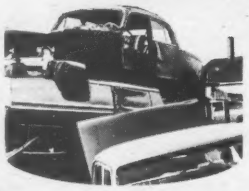

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'Work Smarter, Not Harder'

Information System Planned on Three Levels

By Robert L. Rector
Special to CW‡

In today's unpredictable, resource-scarce environment, every organization that has (or plans to have) an information system needs a plan. Planning occurs at three rather distinct levels: top level (strategic), middle level (management planning) and the third level (operational planning). Each level has a unique set of characteristics associated with it.

Depending on the level of management, planning time horizons vary. Senior management does strategic planning for a period of five to 10 years ahead, while at the operational level the planning horizon can be as short as one year.

Now an even stranger dichotomy develops. Senior management really prefers not to be personally involved with tactical or organizational activities. It wants to identify and allocate corporate resources leaving the tactical activity or physical acquisition and control of the resources to middle management. While the planning focus may be different, the definition of productivity remains relatively constant.

Productivity requires the effective utilization of assets and resources and getting predefined goals done on schedule and within budget.

We should never lose sight of the fact that we are planning to improve people productivity. This is where all the recent emphasis has been — Theory Z, quality circles, matrix management, project management and so on.

Now along comes planning (strategic, managerial and operational) suggesting the old work simplification ethic — "work smarter, not harder." Working smarter seems to imply we work on those things that are most beneficial and exclude doing things of little or no benefit.

Resource Identification

The preliminary step to planning for productivity means identifying resources such as personnel, equipment and money before they are needed. When planning to improve productivity, we must also identify specific goals, such as a system, hardware, software and data communications. We must then apply the resources, usually to an identified problem or an anticipated situation.

Strategic planning for information systems entails senior management setting strategic directions in the development of corporate business plans, then overseeing the design of the information system's architecture to meet corporate needs. The process is then turned over to project planners for detailed planning and implementation.

We must plan to accommodate four essential information-related activities:

- Identification and definition of information critical to the business and management, such as financial, operating, market, human resource development and short term.
- The processing or synthesis of data into meaningful information.
- The communication or transmission of the synthesized data information.
- The determination of how to use the information. Perhaps this is the question of how much data.

One of the difficulties the planner faces is forecasting or predicting where the organization's DP growth will occur. It is not as much a problem of determining what will be happening with hardware and software as it is of determining what other factors will be influencing the information systems environment.

The problem faced by the systems planner is not what the technology will be, but rather the more emotional issue of when it will be accepted or become economically feasible to implement.

Set Standards

Many firms today are installing data bases, which were developed more than 15 years ago, as though they were the latest in computer software technology. Today's technology is in distributed data bases, network nodes, heirarchical systems and mini/microcomputers. We will see dramatic changes during this decade — the passing of programmers as an elite group because preprogrammed chips and components will be a part of every conceivable device with mini/micros in every functional area.

Poor planning means things have to be redefined and redone, which means a need for closer supervision exists. When there is no clear plan, people do what they believe is correct and are then required to change things to be compatible or meet the overall objectives. This leads to reactive rather then proactive planning.

Planning is needed to identify standards. The lack of standards can result in splintered equipment and application selection, data base conflict, the reduction of system controls, data communications, network protocol problems, distributed processing and the like. Yet this should never mean distributed control.

The organizational placement of the individual will determine where the greatest effort is expended. Applying the resource means execution or action, having the resources available to meet the plan.

One of the keys to productivity is measurement and feedback, which can be offered as a standard. Underlying the planning effort is the desire to improve the work process and facilitate decision making as well as optimize resources.

To achieve any productive results, efficient or inefficient, there must be a response action. There are essentially three types of reaction: positive, negative and neutral.

It is always easier to be a critic rather than an artist. Those who are critics or who are constantly responding to crises are reactive. They have a stronger tendency to resist change, redo work and backtrack, responding to problems rather than preventing them. Proactive, or positive response, is normally done with forethought and expectation. Proactive planning means knowing what needs to be done before the moment of execution.

Rector is a principal in the consulting firm of Anson, Lee, Rector & Co. based in Tarpon Springs, Fla.

DP Head Expects 100% Performance, Gets It

(Continued from SR/43)

ers has been a high priority. The training has included vendor-sponsored classes, professional seminars and in-house training provided by the software house. The training program is an ongoing process and includes occasional seminars for corporate management to familiarize them with "the beast in the back room."

A data processing committee reportable to the board of directors was formed to consider user demands and the future growth of both the company and data processing. Because the Datapoint system is easily upgradable (without software changes) we have been able to accommodate a 200% growth period easily with add-on equipment. DP needs for the next five years have been planned.

A disaster recovery plan has been written, approved and tested. We have a reciprocal agreement with another Datapoint installation in our area for processing backup so no deadlines will be missed by either company.

The national accounting firm that audits our company annually has been included on some systems' design and conducts regular audits of our installation. There have been no major comments made relative to the management or operations of the department.

Although all these tasks are handled by most DP shops, it is the attitude towards productivity that allows smooth running in the shop.

Other DP managers expect crises and problems, and that is what they get. We demand good results, and that is what we enjoy.

Casentini is director of data processing for Hayward Lumber Co. of Salinas, Calif.

Recognition Helps Workers

(Continued from SR/44)

performance when they see that it is in their best interest to do so.

Throughout the organization there is a need to be much more creative when it comes to giving rewards. The assumption is that unless money is involved, the reward has little meaning. However, it is much more important that the reward be meaningful to the employee and closely tied to good performance than that it be monetary in nature. There are many other options, including time off, retreats and seminars, organization privileges like expense accounts and use of memberships and easily overlooked things like praise and public recognition, which are effective in rewarding good performance. Caring about people can have a remarkable effect on productivity. There is clear documentation of the innovations and savings that employees have brought about when given the opportunity.

Aranda is director of the Productivity Institute and assistant professor of management in the College of Business Administration at Arizona State University.

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Change Through Reinforcement

Reward System Can Boost People Productivity

By Edward J. Feeney
Special to CW‡

Management's reliance on so-called productivity-boosting computer technologies may be contributing more to the cause of sagging productivity than to its solution.

It is an obvious fact that every computer center is dependent upon two major items — hardware and people. The hardware is needed to process the jobs, while the people are needed to write the software and operate the systems.

Historically, the managements of most computer operations have spent a great deal of time and effort reviewing the performance of the center's equipment and publicizing its benefits.

Unfortunately, the performance of the people in most computer centers has not been tracked or publicized as much as the equipment's performance. This situation has led to less than optimal performance by some employees and a feeling of secondary importance by most.

But the realization of this imbalance between hardware and people has given rise to a management technique that is increasingly being recognized as a valuable tool for the computer industry and related data entry field. With this technique, managers can combat slumping productivity rates, reduce absenteeism and turnover, and in most cases, provide increased job satisfaction for employees.

The systematized performance improvement technique utilizes a carefully designed system of feedback and rewards (positive reinforcement) to effect positive changes in human behavior.

It is based on the theory that people are influenced in their job environment by the immediate consequences of the things they do. Therefore, to modify their behavior it is necessary to change the consequences.

The technique is geared to the principle that people work harder and more efficiently if they are rewarded for doing well. Rewards need not necessarily be financial, but may take the form of praise, promotion to greater responsibilities, time off, granting of special requests or whatever is applicable in a particular business setting.

Techniques Adopted

Although still in an evolutionary stage, behaviorally based productivity-improvement techniques are now beginning to be adopted in the application areas for programmers, systems analysts, project leaders and lead programmers.

Under a behaviorally tailored performance-improvement program, rewards are only given when it is certain they will act as an incentive to spurring greater effort.

Furthermore, if people are to show a consistent improvement in their work standards they must be rewarded every time they do well and must be rewarded quickly, not months after the fact.

In addition, rewards must be based on a measurable increase in performance.

An example of such a successful behavioirally tailored reward system is seen in the case of a Midwest electronics manufacturing company that had invested in a sophisticated computer system to trace and control purchase orders.

Less than six months after field implementation the system had failed to work properly for even one day at any of the 60 field terminals.

After a thorough analysis of the problem, it was determined that the computer itself functioned properly. The problem was in the entry of information. Entry clerks were failing to enter data order information in a rapid and timely fashion. Average turnaround time on entering available data had to be five hours or less.

A visit to numerous field offices revealed that most managers and entry clerks did not know what their turnaround time was running on entering data.

In addition, it was found that there were no positive consequences for the best data entry performers. The clerk whose average turnaround time was four hours received no more incentive than the clerk whose turnaround time was six hours.

As a result of this analysis, the management team concluded that turnaround time could be brought within five hours by increasing the number of entries each clerk handled per hour. This was accomplished through the introduction of a new recording system. Supervisors and managers were trained to apply various positive consequences whenever performance improved or was maintained.

This simple recording system, the prioritizing of entries and recognition and the use of other tangible reinforcers increased the volume of data entries 22%.

Big payoffs exist for such improvement but go unrecognized or are undervalued and underemphasized. Nor are the true behavioral causes of performance problems correctly identified.

Consider the following example. Each of 60 keypunchers may cost a company — faced with constant inflation in salaries, benefits, overhead, overtime and equipment — $18,000 annually or nearly $1.1 million. An improvement in productivity of only 10% is worth $108,000; a 20% increase is worth $216,000.

Bearing these figures in mind, even if an organization invested $45,000 for an annual incentive program and the costs of training managers and supervisors in behavior learning techniques, the return on investment could range from 200% to 400%.

Payoffs can also come from reducing turnover, which can run $3,000 per new employee for recruiting, selecting, training and initial lower productivity rates. A 50% turnover rate in a group of 60 employees translates into 24 new employees or an added $72,000 annually.

Output Standards

In developing a behaviorally based productivity program, managers must carefully determine output standards in areas where worker improvement is sought. This measurement provides a base against which future productivity can be compared and should be geared as much as possible to the individual.

Moreover, an effective feedback system must be developed so that both supervisors and employees know exactly what is supposed to be done and what is being done.

By developing output standards and a feedback system, the manager will be able to dispense positive reinforcement when employee performance improves. It is extremely important to remember that such reinforcement should always be positive and delivered immediately after an improvement in performance.

Feeney, who employs B.F. Skinner's techniques of changing human behavior through positive reinforcement, is president of Edward J. Feeney Associates, a management consulting firm located in Redding, Conn.

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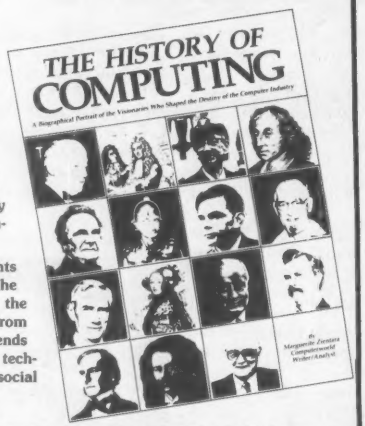

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Programmer Productivity Needs Clearer Focus

By Bill Franklin
Special to CW‡

Computer futurist James Martin has predicted that by 1990 computers will require 93 times as much code as is being generated today, resulting in a need for 27.9 million programmers.

This mind-boggling, if not comical, view of the future dramatically illustrates the need to focus on programmer productivity.

In order to solve the productivity issue, it is important to understand the programming process and the different orientations that have become part of today's programming environment. Large, well-established companies have traditionally employed sophisticated analytical approaches to analysis and project implementation where smaller companies have typically been less formal.

Most-Advanced Techniques

The two most-advanced development techniques used today — prototyping and structured design — are at opposite ends of the implementation spectrum, but they can be used effectively depending upon the situation and the organization's needs. In order to better understand how these tools fit into the programming process it is important that they both be understood.

While prototyping has had negative connotations associated with it for many years and has been referred to as the "lazy man's guide to analysis," it does provide users with a chance to review an application earlier in the implementation process.

What is being done using the traditional prototyping tools is that a decision is made to spend less time on analysis and more time on coding and testing in the hope that the overall project will take less time and that a solution to the user's needs will be reached more quickly.

However, there are some changes taking place in the computing field that can make prototyping more attractive than it was in the past. Some of these changes are:

- More high-level executives are demanding solutions, but do not have time to analyze their needs.
- Users are demanding to become more involved earlier in the design cycle in many organizations.
- Prototyping languages are being developed by the computer vendors that are being viewed as fourth-generation languages (macro code generators).
- And macro code generators are reducing the effort that has been typically referred to as the "time-consuming part" of the prototyping project, coding and testing.

With new prototyping tools, analysis is not as critical as it was using third-generation tools because less time is spent on the coding and testing cycle.

Prototyping should be used when the objective is to provide users with immediate results, to get the user community more involved in the programming process and when it is impossible to get the users involved in the design process.

The use of new macro code generators provides an opportunity to more easily respond to the so called "one-time-only" requests as well as perform ad hoc data base maintenance as required. There is a real benefit to using these tools, when one understands the benefits they derive.

Structured design/programming has been given much publicity over the past few years. The main objective of "structured design/programming" is to attempt to reduce complexity by breaking problems that are too large into manageable segments. There are basically two schools of thought on structured programming: data flow and data structure.

Techniques such as Ed Yourdon's Bubble Charts, Jean-Doninique Warnier's Warnier Diagrams, Meyers and Constantine's Data Flow Diagram, Nicklaus Worth's Stepwise Refinement, as well as pseudocode and Structured English are the most often used and referenced techniques.

Debates over GOTO or no GOTO are indicative of the lack of standardization of philosophy that is part of these techniques. Some of the basic concerns with this process are the independence of modules, the amount of data that is passed between modules, the degree to which a module performs a single function and the size of the module.

Structured approaches force analysis and structure to the design and implementation process. Following the rules of many of these processes increases the chances that the code will be generated correctly the first time, time spent on logic corrections will be reduced and the possibility of identifying subroutines that only need to be coded once will be increased.

Franklin is currently a marketing engineer for Hewlett-Packard's Business Computer Group in Cupertino, Calif.

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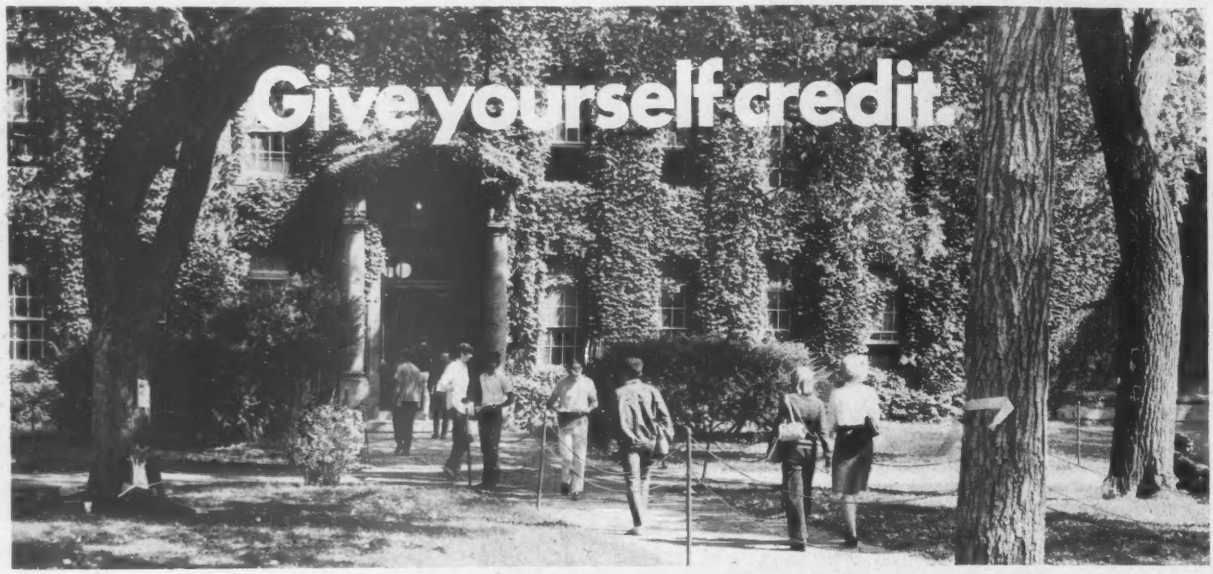

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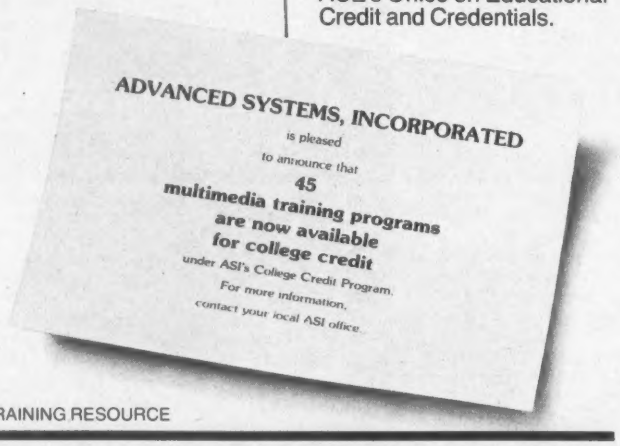

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Replaces Dial-Up Circuits

Multidropping Helps Firm Talk Cheaply

NEWPORT BEACH, Calif. — Using multidropped, leased party lines instead of dial-up circuits to communicate with 20 branch offices across the country meant that Shearson/American Express Mortgage Corp., headquartered here, saved enough to pay for the multidropping equipment "in just a few months," according to Harold Knowlton, vice-president for data processing.

Multidropping is also far more economical than using a separate leased line to each branch, he added, because fewer modems and lines are needed.

Shearson/American Express Mortgage Corp. finances construction projects, among other activities. Seven multidropped lines interconnect its branches, where the loans originate, with the company's DP center in San Bernardino, Calif.

Installed in 1980, this network terminates at the DP center in a Datapoint Corp. Attached Resource Computer (ARC) that includes two file processors accessing up to 240M bytes of data storage. The data base, updated by inputs from the branches, stores the details of each loan application, records its progress through various review stages prior to funding and helps provide a number of management reports, a spokesman explained.

Multidropping has been used for a long time in mainframe-based on-line DP systems, but it only recently became possible to utilize multidropping for mini-based systems. The Shearson/American Express Mortgage Corp. system is one of the first of the latter type. It utilizes multidropping hardware/software provided by Micom Systems, Inc. in Chatsworth, Calif., the spokesman said.

Each of the company's workstations is equipped with a Datapoint 8200 CRT terminal and a Xerox Corp. 1740 Keyboard Send-Receive printer. Up to four of these stations are tied to a Codex Corp. LS196F8 modem and a Micom Micro900 multidrop concentrator.

At the San Bernardino data center, the multidropped lines feed through Codex LS196FP modems to Micom Micro900 Master multidrop concentrators that connect to the Datapoint ARC.

"With this system, no special polling software is required," Knowlton maintained. "It isn't necessary to make changes in hardware or software, and the system provides for automatic retransmission-on-error to ensure error-free communications on each multidropped telephone line," he said.

Local-Area Network Bus-Based

MOUNTAIN VIEW, Calif. — Cromemco, Inc. has unveiled an 880K bit/sec local-area network product based on a bus architecture using shielded twisted-pairs wiring.

C-Net is said to accept a variety of universal computer-based devices, ranging from word processors to automated machine tools. A single C-Net cable span reportedly has the capacity to support 255 users. Stations can be separated by as much as 2,000 meters along a single cable span.

The cable is driven through an isolation transformer by a differential transmitter/receiver to provide common-node noise rejection and complete isolation between network cable and interface. That isolation reportedly prevents the failure of a single node from affecting the entire network. C-Net circuits are configured so video and voice transmission capabilities can be added to the data transmission network. Gateways will be provided for links with other local networks such as Xerox Corp.'s Ethernet; Wang Laboratories, Inc.'s Wangnet; Sytek, Inc.'s Localnet; or X.25-based packet-switched networks.

The current interface used by the network will reportedly allow five workstations to communicate at a cost of approximately $500/station. The cost of a single-user, single-node network interface controller is said to be about $1,000.

Cromemco is located at 280 Bernardo Ave., Mountain View, Calif. 94043.

IDS Unveils Communications Products

LINCOLN, R.I. — In a series of announcements, International Data Sciences, Inc. (IDS) unveiled a network control system, a recording device for mass storage, a hand-held data communications tester and a data communications interactive test set.

The Tech Control Center is a modular system that allows the user to choose from a variety of options to meet network control requirements, according to the vendor. This system performs both interactive diagnostics and passive monitoring of serial data appearing at the RS-232 interface to help isolate data communications problems.

The Tech Control Center Series 8900 Minitech control modules provide patching, switching and monitoring for reconfiguration back-up systems and testing data networks. Option modules include data carrier detect alarms and power supply redundancy. The Series 8900R Remote Control System version provides remote A and B switching and status reporting over an asynchronous dial-up or leased-line data link. The 8900 costs $6995; the 8900R is priced at $6700, the vendor said.

The Model 7000 Datatape is a microprocessor-based recording device that provides a nonvolatile mass storage for digital data associated with the RS-232C and V.24 communications interface. It was designed for use as a portable stand-alone unit and can be used in conjunction with the IDS Hawk 4010 Datatrap. This item costs $6,050.

The Model 67/60 is a hand-held data communications tester that is also microprocessor-based. It combines a full-function bit error rate test capability, polling test, echo test, Perkin-Elmer Corp. FOX and User message generator with a full RS-232C, V.24 breakout and monitor panel. It is priced at $995.

The IDS Hawk 4030 test set checks modems or terminals, features a 20-char. data display and weighs 12 lbs.

The Hawk 4030 is unit priced at $3,995 and is available from IDS at 7 Wellington Road, Lincoln, R.I. 02865.

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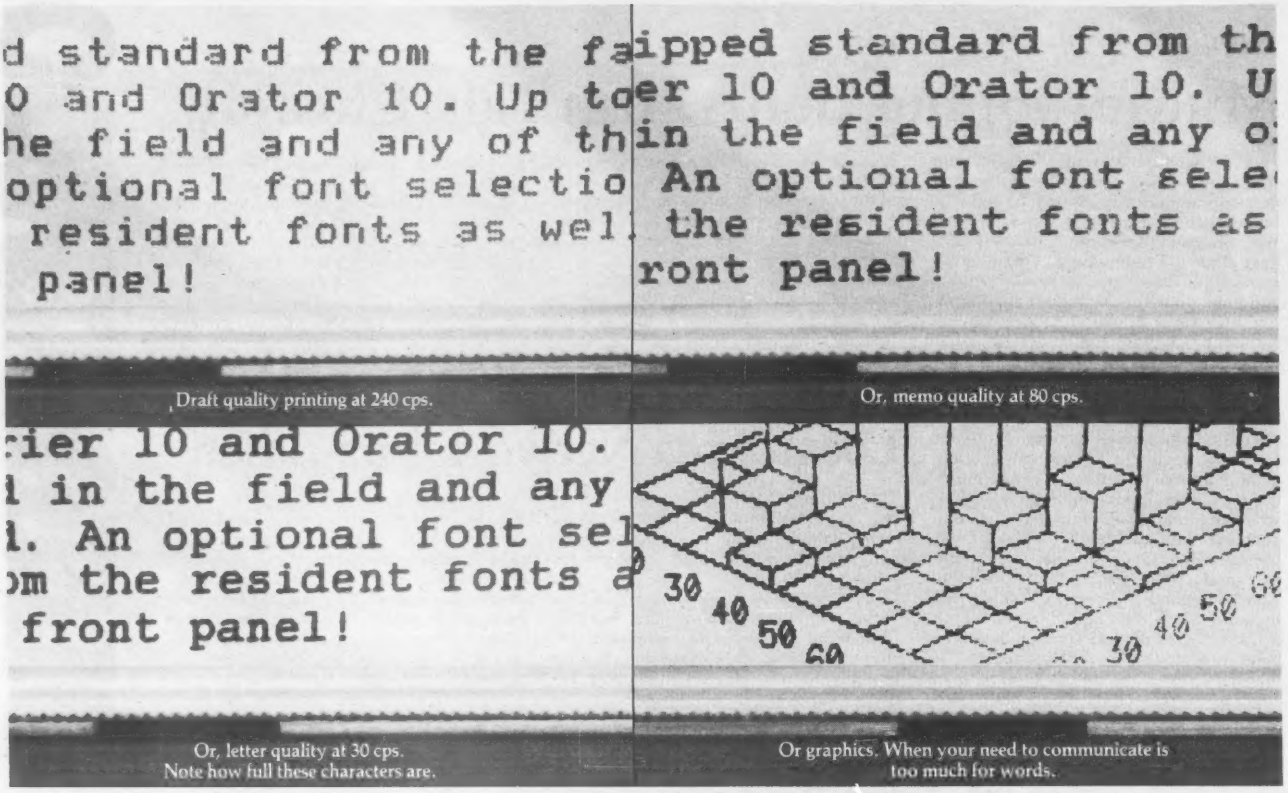
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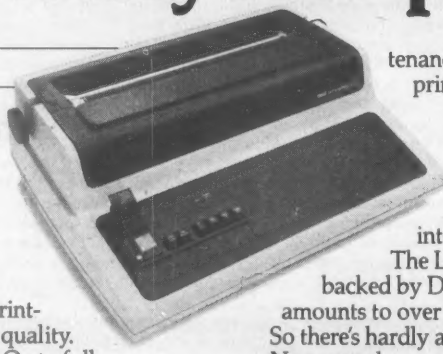

Digital's new Letterprinter 100 gives you the versatility of four separate printers in one printer. Yet it costs the same as many ordinary single-purpose printers.

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To buy your printer, see your local Digital terminals distributor or sales representative today or contact: **Digital Equipment Corporation,** Terminals Product Group, 2 Mt. Royal Avenue UP1-5, Marlboro, MA 01752. Telephone toll-free (800) 225-9378 (outside the continental U.S. or in Massachusetts call (617) 480-4077 between 8:30 A.M. and 5:00 P.M. Eastern time.) In Europe: Digital Equipment Corporation International, 12 Av. des Morgines, CH-1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

'Com 2661' Combines Usart, Rate Generator on MOS Chip

HAUPPAUGE, N.Y. — A device that combines a universal synchronous/asynchronous receiver/transmitter (Usart) with a programmable transmission rate generator on one MOS large-scale integration chip has been unveiled by Standard Microsystems Corp.

Com 2661 was designed to interface microprocessors or microcomputers to data communications links or microprocessor peripherals. It reportedly can accommodate asynchronous formats and all standard character-oriented synchronous formats such as IBM's binary synchronous communications.

Features include programmable character formats, programmable clock rates, on-chip break detection and generation, automatic serial echo and two loop-back modes, the vendor said.

Com 2661 is available in 28-pin plastic and ceramic packages. The price for 100 pieces is $10 in plastic and $32 in ceramic, the vendor said from 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Analyzer Fits RS-232 or V.24 Data Interface

PROVIDENCE, R.I. — Electro Standards, Inc. has announced an RS-232 interface analyzer and two lines of terminal switches.

The Model 700 RS-232 interface analyzer was designed for standard RS-232 or V.24 data interface of modems, multiplexers, terminals and processors. The unit is inserted between the data terminal equipment and the data communications equipment and costs $275, the vendor said.

The Model 8022-D CRT terminal A,B,C,D switch is a coaxial switch designed for use in switching a two-wire input to any one of four outputs. For example, the 8022-D can be used for switching an interface to IBM's 3270 CRT terminal or a two-wire telephone line, according to the vendor said. The switch costs $150.

The firm also announced an A,B switch that allows users to switch I/O ports, peripheral devices and modems. The switches are compatible with the RS-232 interface. There are four models, each with a 25-pin connector on the rear panel. The units cost $150. The vendor can be reached at P.O. Box 9144, Providence, R.I. 02940.

Fiber Optic-Based

Point-to-Point Mux Fits IBM 3270

FRAMINGHAM, Mass. — Fibronics Ltd. is offering a distribution system for IBM 3270 series peripherals that reportedly removes the requirement for large numbers of coaxial cables running from the 3274 controller to either 3278/9 terminals or 3287 printers.

The distribution system is a point-to-point multiplexer system based on a single fiber-optic cable, which is said to be compatible with IBM protocols.

The vendor claims there are substantial cost savings in using its system.

For example, 16 I/O devices (terminals or printers), separated by a half mile (800 meters) from an IBM 3274 controller, are said to consume eight miles (13 kilometers) of coaxial cable at an approximate installed cost of $19,000.

Using a pair of Fibronics FM1674-16/1678-16 multiplexers, plus one fiber-optic cable, will cost the user $11,000. This results in a savings of $8,000, according to Fibronics.

Prices start at $6,000 for a complete system, the vendor said from 655 Concord St., Framingham, Mass. 011701.

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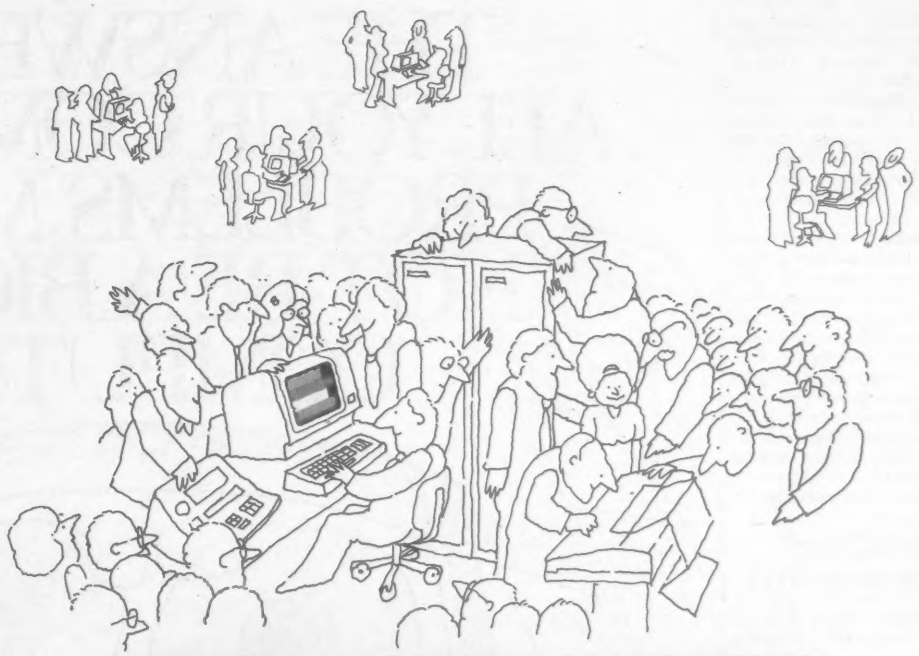

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Package Links MUX to DEC Gear

NORCROSS, Ga. — Digital Communications Associates, Inc. (DCA) is offering a software package that reportedly allows the DCA 205 Unibus interface statistical multiplexer to expand its interface compatibility with Digital Equipment Corp.'s systems 2040, 2050, 2060, 2080, 1090 and 1091. The software was developed by Energy Enterprises.

The System 205 emulates the operations of DEC DZ-11 asynchronous terminal interface boards and is compatible with all Unibus-based DEC computers which drive DZ-11s. A DZ-11 is a DEC serial I/O device that allows terminal user access into the computers.

The System 205 acts as an alternative to the DZ-11. It supports up to 128 ports while each DZ-11 supports eight ports and uses just one Unibus slot. It can be used in point-to-point or multidrop configurations.

A basic System 205 costs $4,250, according to the vendor at 303 Technology Park, Norcross, Ga. 30092.

Digital Users Get Emulator

BENNINGTON, Vt. — An intelligent terminal emulator for Digital Research, Inc. CP/M-based computer systems has been announced by Shared Systems Technologies, Inc.

The Advanced Communications Emulator (ACE) is said to collect and edit data locally without regard to host availability, then later transfer it to the host for further processing.

In addition, reports or data generated by the host reportedly can be transferred to the local CP/M system and printed or processed as time permits. ACE can communicate with Honeywell, Inc.; IBM Corp.; and Digital Equipment Corp. time-sharing computer systems.

A single CPU license costs $150 with volume discounts available from the firm at Rt. 7 S., Box 163, Bennington, Vt. 05201.

Rixon Offers Switching MUX

SILVER SPRING, Md. — An intelligent switching multiplexer said to offer error-free data transport, user port selection, port contention, network management and supervision of up to 240 asynchronous inputs over as many as 14 composite links is available from Rixon, Inc.

The DCX 850 can be located in a network to provide support for more than 15,000 total network ports, the vendor said.

It uses six basic card modules: the low-speed channel module, automatic repeat/request module, buffer module, systems test and configuration module, user switching option module and bus extension module, according to the vendor.

The modules are housed in a 17 card-slot frame with an integral power supply. Up to five frames can be integrated in a DCX850, giving the user a custom arrangement of card modules to support the network, the vendor explained.

The multiplexer starts at $18,480, Rixon said from 2120 Industrial Pkwy., Silver Spring, Md.

Device Allows Switching Between Systems, Peripherals

ALTADENA, Calif. — A battery-powered, software-controllable device that can switch between computers and peripherals has been unveiled by Advanced Systems Concepts, Inc. (Asci).

The Asci Switch is said to decrease the need for duplicate serial ports or peripheral devices. The unit is said to allow-end users to have software-controllable switching between any two peripherals using only one computer port or to allow two computers to share the same peripheral by software switching of the peripheral.

Model A10 switches 10 lines and Model A25 24 lines of the RS-232 serial interface. The A10 costs $295 and the A25 costs $345 from the vendor through P.O. Box Q, Altadena, Calif. 91001.

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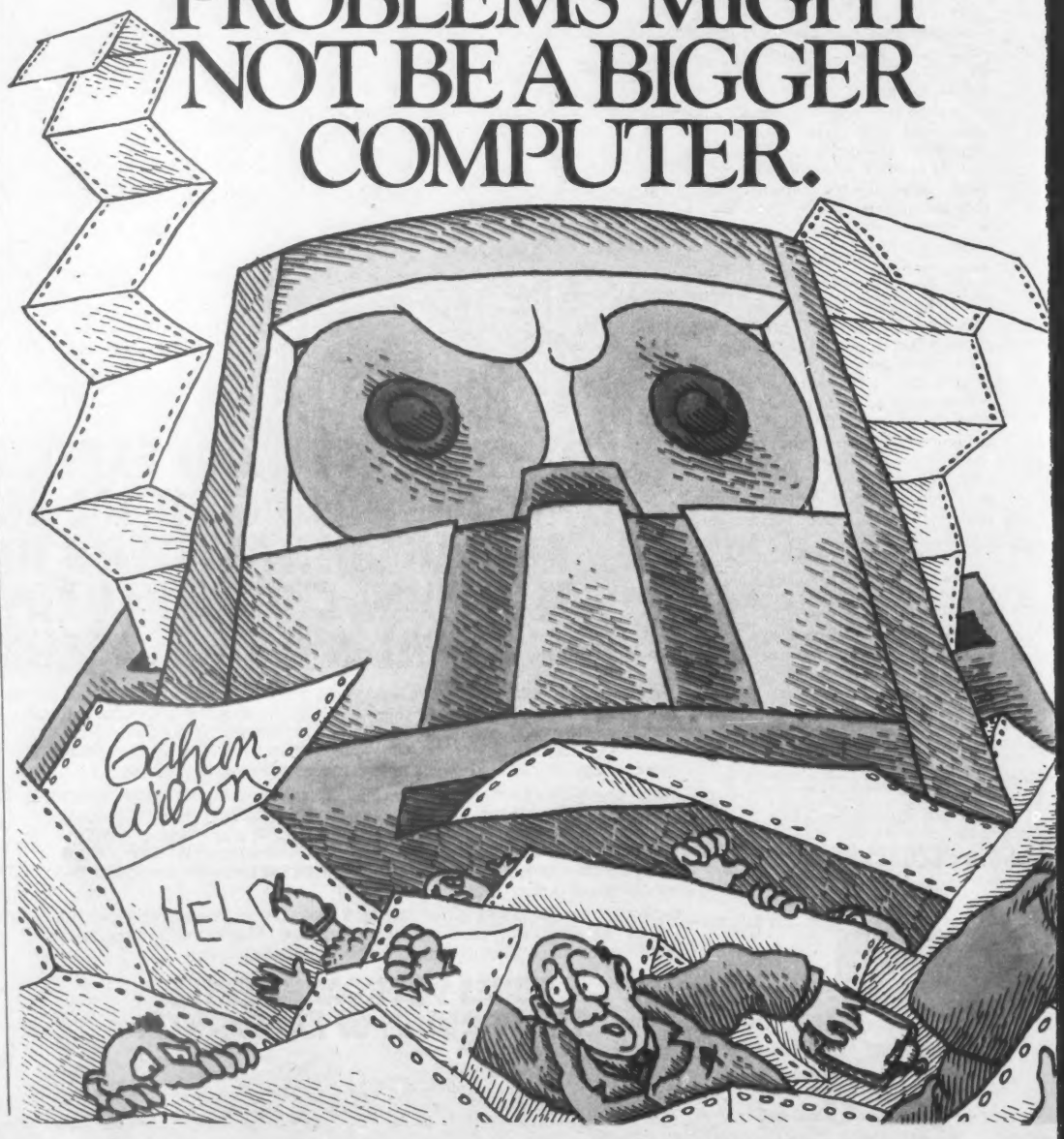

Cmos Modem Microboard Bows

SOMERVILLE, N.J. — RCA Global Communications, Inc.'s Solid State Division has released a Cmos direct connect modem microboard, the CDP18S653, for use with its Cmos microboard computer system.

The modem microboard was designed for use in distributed processing, data acquisition and industrial controls applications requiring long-distance intercomputer communications, according to the vendor.

The modem microboard is said to provide a self-contained data communications capability to allow the user to communicate over standard dial-up or direct-distance-dialing telephone lines.

The modem microboards are available in both 300 bit/sec, full-duplex and 1,200 bit/sec, half-duplex versions, the vendor said. Both feature auto-answer, auto-originate, dial-tone and busy-tone detect to permit tandem and repeat dialing and contain onboard dual-tone multifrequency or pulse-dialing options, according to the vendor.

The CDP18S653V1 (300 bit/sec) is priced at $399 for up to nine units. The 1,200 bit/sec version is priced at $449 for up to nine units.

RCA's Solid State Division is located at Box 3200, Somerville, N.J. 08876.

Bell-Compatible Modems Out

SUNNYVALE, Calif. — A line of Bell-compatible asynchronous 0- to 300 bit/sec data modems with integral data access arrangement circuitry has been announced here by Prentice Corp.

The product line consists of the P-103J originate/auto-answer; the P-113C originate; and the P-113D auto-answer models. All are designed for half- or full-duplex operation over two-wire networks. Patented circuitry for use over dial-up, switched-telephone networks includes solid-state switching.

Special features also include front-panel-mounted test controls for conducting local digital loop-back and local analog loop-back tests.

Both stand-alone and rack-mounted versions of these modems are available for immediate shipment, and single-quantity prices range from $250 to $470. The vendor is based at 266 Caspian Drive, Sunnyvale, Calif. 94086.

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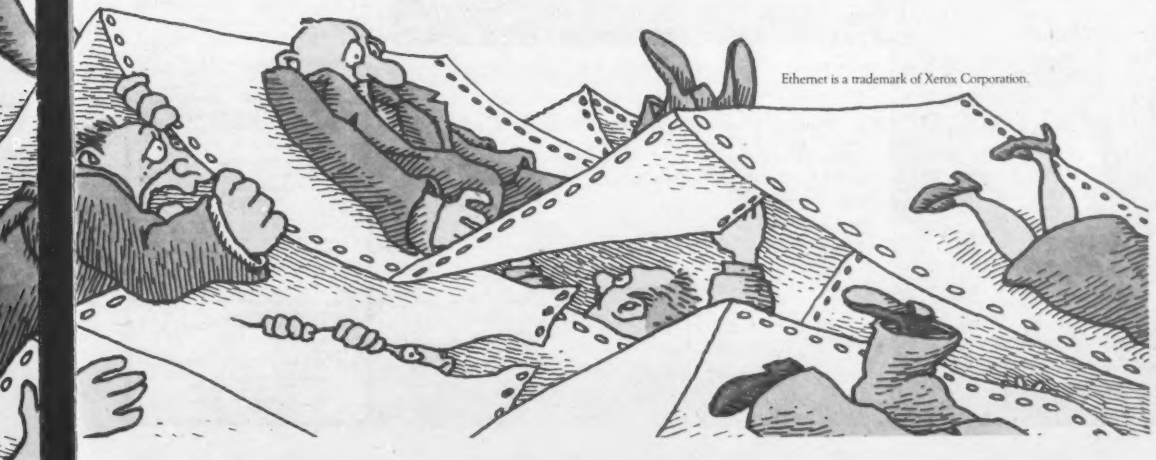

Ethernet is a trademark of Xerox Corporation.

Processor Beefed Up

WATERTOWN, Mass. — Amnet, Inc. has introduced an enhanced version of its minicomputer-based communications processor designed to provide two-way communications between Amnet's private data network and its Tymnet, Inc. public data network.

The Tymnet Interface is an enhancement to the Amnet Nucleus 5000. The device is a packet-switched communications processor interface that extends the reach of the private network by emulating a Tymnet terminal. The interface can run under any mainframe, according to the vendor.

It is said to support features such as direct dial in/dial out, flow control, 1,200- to 300 bit/sec asynchronous operation and terminal sign-on/log-in procedures.

Cost of the system with the Amnet Tymnet Interface, ranges from $60,000 to $80,000 and is available from Amnet, 101 Morse St., P.O. Box 412, Watertown, Mass. 02172.

CRT Terminal Uses 132 Col

SEATTLE — A CRT terminal said to be conducive to space-consuming financial spread-sheet and modeling programs has been developed by Datavue Corp.

The Datavue 132-C features a 132-col format. The extra width of the terminal is said to permit displaying of 12 calendar months of data along with totals and description columns on one screen.

In addition to a nonglare screen, the terminal features detached keyboard with numeric keypad, 16 programmable function keys, advanced editing features and a nonvolatile memory for storing frequently used terminal attributes and emulations, the vendor said. Base price for the unit is $1,995 from the vendor, 1911 22nd Ave. S., Seattle, Wash. 98144.

Cable Multiplexer Unveiled

RIDGEFIELD, Conn. — Computrol, a division of Kidde Automated Systems, Inc., has announced Megaplex, a coaxial cable multiplexer.

The multiplexers combine user-programmable microprocessors at each remote multiplexer station with a 1M bit/sec coaxial cable transmission link. Up to 255 stations, each with a capacity of 2,048 points, can be multidropped on a single cable up to 32,000 ft long, according to the vendor.

The units feature a typical scan rate of 500,000 point/sec. Applications include process control, plant access and security, training simulators and robotics, the vendor said.

The Megaplex units cost from $4,000 to $20,000, a spokesman said.

The vendor is located at 15 Ethan Allen Highway, Ridgefield, Conn. 06877.

Datatel Offers Four-Channel Mux

CHERRY HILL, N.J. — Datatel, Inc. has introduced a four-channel statistical multiplexer with standard features that include error protection, individual channel down-line loading, flow control, automatic speed recognition, built-in diagnostics and status reporting.

The DCP5000 concentrates data from up to four asynchronous devices for transmission over a single telephone line. An identical unit at a remote location reverses the process, restoring the four separate data streams. Inputs may be dial-up or dedicated at mixed speeds to 9,600 bit/sec and the output can be any synchronous speed to 19,200 bit/sec, the vendor said.

Automatic speed recognition, which detects speeds up to 1,200 bit/sec, is incorporated into the DCP5000 and can be switched in or out on an individual channel basis, the vendor said.

The statistical multiplexer costs $1,300.

Datatel is located at 1008 Astoria Blvd., Cherry Hill, N.J. 08034.

MAI Gains Video Port

MISSISSAUGA, Ont. — A video terminal said to be compatible with MAI Basic Four Corp. systems and featuring a parallel printer port is available from Cybernex Ltd.

The Model MDL-B4E can be interfaced with a printer when hard copy is needed, the vendor said. An auxiliary bidirectional serial interface includes a separate bit/sec rate selection from the main port.

The terminal is said to feature a high resolution 7-in. by 12-in. dot matrix character on a direct etched nonglare P31 green phosphor CRT screen and a detached keyboard.

The terminal costs $1,750 (U.S. dollars) per unit with multiple purchase discounts available.

Cybernex is located at 2457 Dunwin Drive, Mississauga, Ont., Canada. LfL 1T1.

Interface Boosts Monitor Reach

WORCESTER, Mass. — Artel Communications Corp. has introduced a line of fiber-optic computer graphics interfaces that are said to allow users of high-speed video graphics to place their monitors up to 30 times further from the computer than is possible with coaxial cable.

The 2010-Series are plug-in interface modules that transmit high bandwidth (up to 30 MHz) RS-170 video graphics over 10,000 ft of fiber-optic cable. The series accommodates both color and monochrome transmissions for full or limited graphics, the vendor said.

The 2010-Series costs about $2,000. Artel Communications can be reached at P.O. Box 100, West Side Station, Worcester, Mass. 01602.

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GST Debuts Low-Cost CAD/CAM System

SOUTH WINDSOR, Conn. — Gerber Systems Technology, Inc. (GST) threw its hat into the low-cost computer-aided design and manufacturing (CAD/CAM) marketplace recently by introducing a turnkey system for mechanical, electrical and electronic component design and drafting.

The GST offering comes on the heels of similar low-priced — under $100,000 — CAD/CAM systems that have been unveiled in the last few weeks by such firms as Telesis Corp., a new company based in Chelmsford, Mass., and Applicon, Inc.

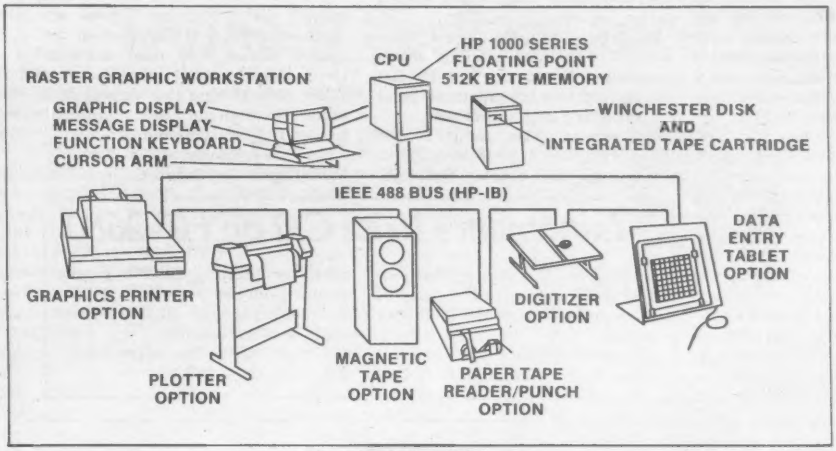
GST's Autograph series systems each include a Hewlett-Packard Co. 1000 series Model 2111 minicomputer with 512K bytes of memory, a high-resolution black-and-white or color display, a Winchester disk drive and a streaming tape cartridge for backup.

The systems also have HP's high-speed interface bus, which allows them to be linked with a variety of plotters, graphics printers, paper tape punches and readers and magnetic tape drives, a spokesman said.

The Autograph systems were designed to be used as standalone graphics processors for users in the areas of mechanical design and drafting and manufacturers of machine parts and form tools such as molds and dies used in metalworking. The systems can also be used for electrical and electronic design and component production, the spokesman added.

However, the systems can also be used as part of a factory communications network by incorporating the optional Gerber network module (GNM). Using the module, the system is said to act as an intelligent remote graphics workstation and communicate with the firm's large-scale IDS-80 CAD/CAM system. The computer can also communicate with other Autograph systems, mainframe computers or machine tools, the spokesman noted.

The firm's GNM supports both synchronous and asynchronous communications under a variety of protocols.



The GST Autograph System

Software applications modules for the system can be purchased separately and are available in three categories: mechanical design and drafting, manufacturing and electrical and electronic design.

The GST Autograph series systems are priced from $87,000 from the firm at 40 Gerber Road E., South Windsor, Conn. 06074.

Disk Drive Emulates IBM 3350

F/4000 Storage Capacity Extended

MOUNT LAUREL, N.J. — A 635M-byte disk drive that is said to emulate two IBM 3350 drives is available from Formation, Inc. for use in its F/4000 32-bit information system.

The F4350 disk drive was designed to extend the storage capacity for F/4000 system users, the vendor said. When attached to an F4830 disk controller one F4350 disk drive appears to the system to be two IBM 3350 units, each with 317.5M bytes of disk storage.

The F/4000 system is program-compatible with the 370 by IBM, the vendor said.

The Formation disk drive increases the disk storage capacity of the F/4000 by more than four times. The user is provided with 635M bytes of nonremovable random-access storage at a data transfer rate of 1.2M byte/sec with the F4350 disk drive, which has 20 recording surfaces with one actuator, the vendor said.

The F4350 is a sealed-disk unit drive that uses Winchester technology to provide high reliability without the need for preventive maintenance, according to the vendor.

The basic F/4000, Models 100 and 200, each support up to four F4350 disk drives of one master and three slaves. Models 100 and 200 both can be expanded to handle eight F4350s.

The basic F/4000 Model 300 supports eight F4350s of two masters and six slaves, according to the vendor.

Priced at $30,000 the F4350 is available from Formation, 823 E. Gate Drive, Mount Laurel, N.J. 08054.

DEC-Compatible Sage Geared for Utility Planning

LITTLETON, Colo. — An automated data entry system that converts graphical data into computer-structured line-based information has been unveiled here by Interactive Systems Corp.

The scanner-based automated graphics entry (Sage) is compatible with the Digital Equipment Corp. VAX-11 family of computer systems and is recommended for mapping, computer-aided design, military, oil exploration and utility planning applications.

While scanning a 40- by 40-in. document in the 26 minutes required, this raster-scan device sends units of recorded data to a DEC VAX machine. Here raster-to-vector conversion software transforms the raster data into a vector file.

A 40- by 40-in. scanner, graphics workstation, pen plotter, VAX minicomputer, software, installation and warranty comprise a turnkey system available for $600,000. The software can be purchased separately for $150,000, the vendor said from 5500 S. Sycamore St., Littleton, Colo. 80120.

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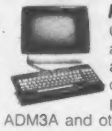

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Intelligent Graphics System Offered

SAN DIEGO — An intelligent graphics system introduced by Megatek Corp. is said to feature color graphics, three-dimensional surface manipulations and real-time user/terminal interaction without dependence on a host computer.

The Whizzard 7600 Graphics System includes an Intel Corp. 8086-based local intelligent front-end (Life) processor, Megatek's 32-bit microprocessor, "Graphics Engine" capabilities and more than 512K bytes of usable random-access memory in addition to 192K bytes of display list memory.

The system was designed to provide real-time remote operations while configured to such central processors as those of Digital Equipment Corp., Harris Corp., Data General Corp., Systems Engineering Laboratories, Inc. and Univac Corp.

Megatek's Graphics Engine incorporates specialized graphics microprocessors linked together by dual bus architecture for pipelined parallel processing of graphics data.

The system costs about $55,000 when equipped with 8-color 19-in. display, graphics engine, desk cabinet, keyboard with joystick and Megatek's Wand software. Prices can reach more than $100,000 when the system comes with dual workstations, 16-color raster graphics capability, remote long-line driver, data tablet or digitizer and additional hardware for dual operations.

The firm is located at 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

Maintenance Price Cut on HP 2680

PALO ALTO, Calif. — Hewlett-Packard Co. has cut the price of maintenance on its HP 2680 laser printer.

Price reductions depend on print volume, the vendor said. A U.S. customer printing 200,000 pages monthly would pay about $615/mo compared with $1,315 previously, a 53% reduction.

HP is at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Micro Disk Pack, Test System Available

NEWTON, Mass. — Lion Precision Corp. has announced a microprocessor-controlled disk pack and spindle test system, the DPTS-325.

The unit evaluates disk pack and spindle performance according to Ansi specifications. Operated under manual control or via microprocessor control, the device measures disk surface displacement, velocity and acceleration. It also makes comparisons to adjustable limits, the vendor said.

The DPTS-325 is keyboard-programmable by operators with minimal data processing training. Other features include motor start-up/shutdown, adjustable warm-up time, probe insertion/retraction, reset of all channels and adjustable measurement duration, the vendor said.

The test system costs $35,000 for a 33-channel, 11-probe system, the vendor said from 60 Bridge St., Newton, Mass. 02195.

Tape Cleaner Introduced

CHATSWORTH, Calif. — Data Devices International, Inc. has announced the Mark XX, a magnetic tape cleaner.

The unit operates at 500 in./sec and processes a 2,400-ft reel of computer tape in 1.92 min. Other features include a footage counter, automatic unload, a key-lock erase station and stop-on-defect, the vendor said.

The unit costs $8,995, the vendor said from 20235 Bahama St., Chatsworth, Calif. 91311.

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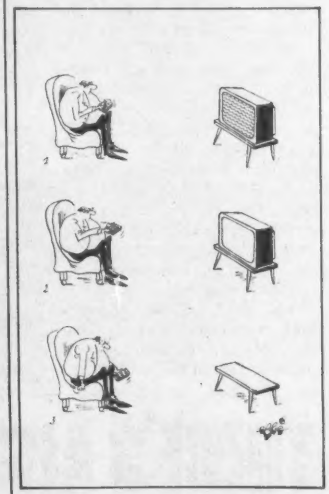

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Multitask 'CAT III' Extends Cado Line

TORRANCE, Calif. — Cado Systems Corp. has announced a multitasking, expandable computer system said to be fully compatible with other systems and peripherals in the firm's product line.

Called the Cado CAT III, the system can execute any of Cado's 300 application program packages, according to the vendor. The system can also be augmented by adding an RS-232-based data processing or word processing printer.

The CAT III can be expanded by the addition of a single circuit card to support two additional terminals, printers or other communications devices.

Options include storage ranging from 1.2M bytes on diskettes to 15M bytes on micro-Winchester disks, Cado's financial and word processing software and its self-teaching tutorial programs.

A basic CAT III costs $4,830 and is available from Cado Systems Corp. 2771 Toledo St., Torrance, Calif. 90503.

Memories Expand Up to 48K Bytes

SALT LAKE CITY, Utah — Holmes Engineering has announced three memory system models that are said to expand memory from 16K bytes up to 48K bytes for Tandy Corp.'s TRS-80 Models I and III and Personal Micro Computer, Inc.'s PMC-80/81 microcomputers.

Called Internal Memory (IM), the boards can plug into each system's random-access memory (RAM) sockets and reportedly do not require any modifications. However, the microcomputer systems must already have 16K bytes of memory, the vendor said.

The IM-1 is said to upgrade TRS-80 I systems to a maximum capacity of 32K bytes with RAM. The IM-2 has a 48K-byte capacity for the TRS-80 Model I and III with RAM. The IM-2P for use in the PMC-80/81 has a memory capacity of 4K bytes.

The IM boards are said to be designed to avoid reboots and data losses and to run at high speeds.

Cost for the IM-1 is $86. The IM-2 and IM-2P cost $139.50 each. The packages are available from Homes Engineering, 3555 S. 3200 W., Salt Lake City, Utah 84119.

High-End Additions Aid Domain Performance

By Tom Henkel
CW Staff

CHELMSFORD, Mass. — Apollo Computer, Inc. has announced two high-end additions to its Domain line of nodal processors that it said offer twice to three times the performance of earlier Domain systems.

Apollo also announced several enhancements to its Aegis operating system and a 19-in. CRT workstation.

The two latest Domain processors, the DN 400 and DN 420, are aimed principally at engineering and scientific users with computer-aided design/manufacturing applications. They support 512K bytes to 3.5M bytes of main memory and feature a 16M-byte virtual address space, the vendor said.

New Units Motorola 68000-Based

Like the original Apollo processor, each of the newly announced units is based on dual Motorola, Inc. 68000 16-bit microprocessors. The combined microprocessors reportedly act as a 32-bit system.

The processors can be linked to Apollo's 12M bit/sec token-passing baseband local-area network, the vendor said.

The processors use 4K bytes of bipolar cache memory and feature support for single- and double-precision floating-point hardware. The two nodal processors are similar in power to Digital Equipment Corp.'s VAX-11/750, Apollo claimed.

The processors feature an enhanced board that reportedly increases performance 200% to 300% over the original Apollo system. The performance enhancement includes single- and double-precision floating-point hardware and a 4K-byte bipolar cache memory. While original Domain systems can be upgraded to the newer processors, a spokesman said those users will not get the full 200% to 300% performance improvement.

The newly announced processors differ over the graphics terminals supplied with each. The DN 400 is reportedly equipped with a 15-in. black-and-white portrait display that is vertically integrated with the rest of the Apollo systems. The DN 420 comes with a 19-in. black-and-white landscape display, which was announced along with the two nodal processors.

The DN 400 includes a 15-in. black-and-white raster scan display.

The newly announced "landscape" display was designed for engineering applications that use horizontally oriented drawings. In a text processing environment, two full pages of text can fit on the 19-in. display. The unit uses a 1,024 by 800 pixel bit-mapped display, which is refreshed 60 times each second for reportedly flicker-free operation. The display can be located up to 50 feet from the Domain user node and, like the firm's 15-in. display, can display multiple windows. The 19-in. unit comes with a built-in speaker, giving it audio capabilities, the vendor said.

Operating System Enhancements

Operating system enhancements are said to include IBM 3270 support, which allows an Apollo Domain computational node to communicate with an IBM mainframe. The unit can be linked to an IBM processor locally or via communications lines. Typical applications for the feature include offloading programs for execution on the Do-

(Continued on Page 66)

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COMPUTER DEVICES

Minifloppy Drive Runs Under Desktop Systems

SUNNYVALE, Calif. — Shugart Associates, Inc. has released a single-sided, minifloppy disk drive designed to run under desktop applications that is said to be two-thirds the height of standard drives.

The SA200 offers 125K bytes or 250K bytes of unformatted capacity in single- or double-density versions. The disks have 48 track/in. and interface compatibility with the industry standard SA400/450 and all dc motors, the vendor said.

The devices were designed to fit horizontally under a CRT and are targeted at entry-level desktop applications such as personal computers.

Height reduction to 2.05 in. was achieved by using low-profile dc drive and stepper motors, according to the vendor. The SA200 is also shorter than standard models and features a removable faceplate for increased space for system designers.

Other features include a track-to-track seek time of 26 msec, transfer rate of 125K- and 250K bit/sec, 12V and 5V power requirements, a mean-time-between-failure goal of 8,000 power-on hours and write protect circuitry for data security.

The SA200, priced at $225/single unit and $125/unit in volumes of 1,000 units, is available from Shugart Associates, 475 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Aviv Magnetic Tape Devices Run On DEC LSI-11/2, 11/23 Systems

WOBURN, Mass. — Aviv Corp. has introduced a magnetic tape controller to run on Digital Equipment Corp.'s LSI-11/2 computers and a cartridge magnetic tape system to run on DEC's LSI-11/2 and LSI-11/23 systems.

Called the TFC-922, the single-quad imbedded controller features a microprocessor design and a dual-density 800 bit/in. and 1,600 bit/in. non-return-to-zero inverted/performance enhancement (NRZI/PE).

The magnetic tape system, called TFS 903, consists of Aviv's single-quad card controller, a Kennedy Co. cartridge Model 6450 tape drive and a rack-mountable enclosure.

The TFS 903 magnetic tape system is software-compatible with all DEC operating systems and Bell Laboratories, Inc.'s Unix using a TM-11 driver, the vendor said. Up to two cartridge drives can be connected to the tape system's controller in radial fashion. The package provides storage capacity of up to 21M byte/cartridge and high-density integrity.

The tape controller supports up to eight transports and allows mixing of two tape speeds along with mixing of both NRZI and dual-density drives, the vendor said. The unit is software-compatible with previous Aviv tape controllers and with DEC's TM-11 handler.

Other features include Fifo data buffer, burst mode transfer operation, compatibility with all industry standard ½-in. tape drives up to 125 in./sec and improved data reliability and throughput due to automatic threshold control during read retry.

Price for the tape controller is $3,300; the magnetic tape system is $3,900. Both products are available from Aviv, 6 Cummings Park, Woburn, Mass. 01801.

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NCR
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Domain, Aegis Get Upgrades

(Continued from Page 65)

main network, program development and initiating batch jobs on the mainframe. The operating system supports communications transfer rates of 9,600 bit/sec.

Also announced was a high-level language debugger for Pascal and Ansi Fortran 77. Called Debug, the feature reportedly works with the Domain language system on the users' Pascal and Fortran 77 programs.

The operating system enhancement also includes a font editor with graphics capabilities. The feature is said to allow users to create and change fonts. The editor presents three displays to the user: an enlarged version for defining a character or symbol, a real-size version and a real-size version imbedded in sample text, according to Apollo.

Other operating system enhancements include 44 additional graphics commands, a feature that allows users to establish bidirectional communications between two processors, remote diagnostics and maintenance, according to Apollo.

In addition to operating system enhancements, the firm announced support for MSC/Nastran, a finite element modeling package developed by MacNeal-Schwendler Corp. The package typically runs on a mainframe processor in the IBM 3033 class. However, Apollo contends the Domain's virtual memory operating system gives each user transparent access to system resources.

A DN 420 with 1M byte of error-checking/correcting main memory and a 19-in. landscaped display costs $37,000. A DN 400 with 1M byte of error-checking/correcting main memory and a 15-in. black-and-white bit-mapped display costs $34,500. Apollo Computer is located at 19 Alpha Road, Chelmsford, Mass. 01824.

Disk Subsystems Out On Rent/Buy Option

SANTA ANA, Calif. — Emulex Corp. has introduced a rental/purchase option program designed to expand system disk storage capacity for users of Digital Equipment Corp.'s LSI-11, PDP-11 and VAX-11 systems.

Under the program, users can acquire full use of necessary disk storage subsystems including Emulex controllers and other disk drive types for a fixed monthly rental payment over a term of either 12 or 24 months. Users can purchase the equipment at any time during the base rental period or at the end, and apply a percentage of the rental paid to the purchase price.

For example, a $20,000 subsystem would rent for $1,760/mo under the 12-month program, the spokesman noted. After 12 months, the user could either continue renting the system at $360/mo or apply 75% of the rent paid toward purchase.

The program is said to be designed for use by such groups as government agencies or public institutions that are generally prohibited from committing to leases for more than one fiscal year at a time. Emulex will reportedly arrange for rental financing through a separate financial institution.

Emulex Corp. is located at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Plotter Option Enhances Point 4 System

IRVINE, Calif. — Point 4 Data Corp. has added a Tektronix, Inc. X-Y pen plotter option to its 4Site turnkey real-time management system. The plotter reportedly produces two-color network diagrams that show the critical path in red.

The 4Site system was designed for use where multifaceted projects are controlled using a program evaluation review technique/critical path method (Pert/CPM) in such areas as construction, aerospace applications and research and development organizations.

An integrated hardware and software package, including the pen plotter, is available in two configurations:

- The 4Site 300 supports up to three concurrent users and includes Point 4's Mark 3 computer with 64K-bytes of local memory, a four-port multiplexer, a 200 line/min printer and a minimum of 16M-bytes of on-line storage.
- The 4Site 500 supports up to 16 concurrent users and includes a Point 4 Mark 5 computer with up to 128K-bytes of local memory, an eight-port multiplexer, a 300 line/min printer and 32M-bytes of on-line data storage.

The plotter option adds $18,000 to the base price of $31,500 for 4Site 300 and $65,000 for 4Site 500, Point 4 said from 2569 McCabe Way, Irvine, Calif. 92714.

Focus System Targets Varied Applications

CHELMSFORD, Mass. — A microprocessor-based computer system for business, industrial and research applications has been introduced here by Computerist, Inc.

The Focus System includes a high-resolution monitor, a commercial-quality keyboard with numeric pad and cursor control and two double-sided/double-density disk drives with a 640K-byte storage capacity. Standard features include a full RS-232 communications interface and extensive parallel and serial I/O capacity.

The system can be used as a stand-alone desktop computer, configured as an intelligent terminal or part of a distributed-processing network, or mounted in a standard 19-in. rack for industrial and research applications, the vendor said.

The system's software comes with a disk operating system, editor, macro assembler, debugging monitor and both integrated and compiled Basic. It reportedly supports a variety of programming languages and applications software packages, including word processing and financial software.

Focus is priced at $3495, the vendor said from 34 Chelmsford St., Chelmsford, Mass. 01824.

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For Point Of Sale applications, Racal-Vadic's 2400 bps modems are a real "shoe-in"!

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The retail stores install the VA2450 modems. They're compact, low profile and the telephone can sit on top, conserving space. An important feature of the VA2450 is the VOICE/DATA/MANUAL switch on the front panel which eliminates the need for a special telephone. During the day, the switch is positioned so the phone can be used for normal incoming and outgoing voice communication. At night, when rates are lower, the modem is engaged so the central computer site (using the VA2440 modem and VA811 dialer) can poll each retail store collecting sales, inventory and other data.

Up to eight VA2440 modems and VA811 auto dialers can be mounted in Racal-Vadic's 7-inch high rack chassis. The auto dialer(s) operate either in a singleline mode (one modem per dialer) or in Racal-Vadic's exclusive Multiline configuration where up to 60 modems can be accessed from a single RS366 or RS232C computer port. That's a tremendous savings in space and hardware.

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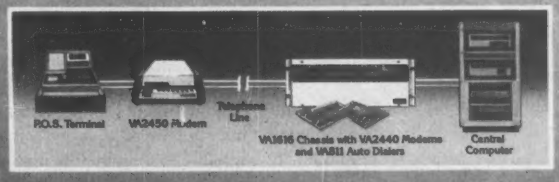

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System Houses Double Disks

ROCKVILLE, Md. — International Systems Marketing, Inc. has introduced the Unisystem, a microprocessor-based computer system that has floppy or Winchester disk drives contained in a single housing.

The system is fitted with its own CPU, a 4MHz Zilog, Inc. Z80 microprocessor; 64K bytes of random-access memory; one user serial port; and one Centronics Data Computer Corp.-compatible parallel port.

It operates under the Digital Research, Inc. CP/M operating system.

The price for the system starts at $2,195 for 500K bytes of floppy disk storage. International Systems Marketing, Inc. is at Suite 6, Jackson Place S., 932 Hungerford Drive, Rockville, Md. 20850.

For LSI-11s, PDP-11s

Box Systems, Link Modules Bow

ORANGE, Calif. — MDB Systems, Inc. has introduced four "Basic Box" memory systems for users of the Digital Equipment Corp. LSI-11 microcomputer and two interprocessor link modules for the DEC PDP-11 and LSI-11 computers.

The Basic Box approach is said to provide users with the system building blocks needed to upgrade systems without purchasing unnecessary modules.

The first of the box systems, the MLSI-11/23S1-600, incorporates an LSI-11/23 CPU with memory management and 256K bytes of random-access memory. Bus termination for 22-bit addressing is also included.

The second system, the MLSI-11/23S2-600, includes the features of the first and adds a systems communications module, making a total of three dual-size modules in a 16-module backplane. The MLSI-11/23S3-600 features current loop serial interface with bootstrap and a programmable-line time clock with four-level interrupt. The 128K version of this system is the MLSI-11/23S4-600.

The prices of the four systems are $4,950, $5,350, $4,250 and $4,650, respectively.

Also introduced by MDB Systems are two interprocessor link modules for users of the DEC's PDP-11 and LSI-11. With the DR11-B direct memory access modules, two PDP-11s or two LSI-11s can communicate with bidirectional data transfer rates to 4,000K bit/sec, the vendor said. The interfaces are housed on a single quad-size board.

The single-unit price of the MDB DR11-B for the PDP-11 is $1,450 and for the LSI-11, $650. More information can be obtained from MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

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With advanced microprocessor technology, Universal Data Systems has produced a Bell-compatible 212A modem offering superior performance at prices unmatched in the industry. $685.00 buys a single 212A; ask for quantity discounts on multiple purchases of free-standing units or OEM cards.

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Datasaver 200W Power Supply Out for Micros

SAN LUIS OBISPO, Calif. — Cuesta Systems, Inc. has announced a 200W version of its Datasaver, an ac power supply.

The unit is available for microcomputers, including IBM's Personal Computer.

Datasaver reportedly provides continuously filtered ac power from a single U.S.-standard Nema 5-15R output receptacle located on its rear panel. At full power, the unit supports most systems for two to five minutes with a range of 15 to 30 minutes at half power in a blackout or brownout condition, the vendor said.

The unit costs $695, is transportable and can operate off a 12V source, such as a car cigarette lighter, a spokesman said.

The vendor is located at 3440 Roberto Court, San Luis Obispo, Calif. 93401.

Grid's Compass Draws Praise, Some Criticism from Consultant

By Bruce Hoard
CW Staff

SAN FRANCISCO — Office Systems Consulting Group President Thomas R. Billadeau and Grid Systems Corp. President John Ellenby agree on at least one point about Grid's newly unveiled Compass personal computer — they like it.

"Without question, it is the best portable terminal to date," said Billadeau, an office automation consultant.

"It is a very professional product for people who are doing serious work," Ellenby maintained.

Billadeau touted Compass [CW, April 12] for its user friendliness. By providing more than one line on its screen, offering a full keyboard and fitting into a briefcase, it gives users what they have been looking for, he said.

Despite his praise, however, Billadeau does not think Compass is perfect. "I want it to be four pounds instead of nine pounds and I want it to cost $6,000 less," he declared. The unit costs $8,150 — far more than its personal computer contemporaries. Not that the price will cripple sales. "They're still going to sell tons of them because users are just dying for that kind of product," he maintained.

Eight-thousand dollars plus may start sounding more expensive if four Grid competitors fulfill Billadeau's prediction by introducing portable personal computers in the $3,000 range between now and the June National Computer Conference (NCC). "They've got some competitors and I think they'll have lots more by NCC," he observed.

Although he complimented Compass' functionality, Billadeau wondered if the computer actually offers more than is necessary. Potential users may be enamored of its qualities, but find they do not really need all of them, he suggested.

The idea of less functionality at a lower price did not appeal to Ellenby. He said the functionality required by his users is "very high" and, as far as simplicity is concerned, Grid's president maintained that several of his competitors seem to have omitted it from their systems.

Ellenby also rejected the idea of price being a barrier to buyers. "That's not our experience with our customers."

First Portable Offering

The personal computer market will be affected by the new product because it is the first portable offering, according to Billadeau. He discounted the 26-pound Osborne Computer Corp. Osborne 1 on the grounds it weighs too much. "In my opinion, a truly portable computer has to weigh less than 10 pounds," he commented. On the other hand, he said, "I'm not sure the personal computer market realizes what a good thing portability is." For instance, many personal computer users are financially oriented; they do not travel much and thus have less of a need for the communications options of Compass, the consultant explained.

The overall office automation market should react differently, Billadeau claimed. The impact there will be "dramatic" because some of the largest obstacles to the industry are based on the lack of communications features.

The importance of portability is the flexibility it brings to managers who tend to use new things at home better than they do in the office. "The manager doesn't like to be a captive of the office," Ellenby added.

"The Compass is designed for use by people in large companies," he continued. Favoring the computer because of its systems approach and its ability to access external as well as internal data, he maintained that "what it really provides is a balanced approach."

He expressed no fear of other competitors jumping into the portable, personal computer swim. Grid is positioned financially and otherwise to repel their challenges, and things will probably get even better, he claimed.

Transceiver Transmits Oil Well Logs By Microwave

FAIRFIELD, N.J. — Continuous paper-length transmission of oil well log data over telephone lines or microwave is one feature of a facsimile transceiver introduced by Rapicom, Inc.

The 6100 digital transceiver reportedly allows transmission of full-length well logs in chart form, platform and pipeline crew reports, supply figures, district drilling summaries and directories from remote supervisors.

Both typewritten and handwritten graphics data is suitable for transmission from international, domestic and off-shore sites, the spokesman for the vendor claimed.

This product is said to be compatible with all CCITT Group 3 digital facsimile equipment. It reportedly offers optional Group 2 compatibility for communications with slow-speed analog facsimiles.

Transmission speeds of 30 sec and 50 sec are achieved through a 9,600 bit/sec step-down modem, the vendor said, and selectable contrast controls for light, normal or dark originals are available.

The 6100 can be purchased for $10,000 or rented for one year at $297/mo.

Rapicom is located at 7 Kingsbridge Road, Fairfield, N.J. 07006.

Lexisoft Adds Math Features To 'Spellbinder'

DAVIS, Calif. — Lexisoft, Inc. has upgraded its Spellbinder word processing software to include number processing features such as fixed-point arithmetic, vertical column editing and decimal tabbing functions.

Spellbinder is a microcomputer WP program with an integrated set of number processing capabilities. Nonnumeric features were added to the upgrade, reportedly allowing it to track up to five fonts and drive the second-generation dot matrix printers while supporting all inherent capabilities.

The enhanced software costs $495 from Lexisoft, P.O. Box 267, Davis, Calif. 95616.

DEC Brings Out Daisywheel Printer

MAYNARD, Mass. — A letter-quality printer said to feature daisywheel technology, bidirectional printing and an audible "paper out" warning has been introduced by Digital Equipment Corp.

The desktop LQP02 replaces daisywheel printers currently supplied with DEC's word processing systems. The printer can operate in full-duplex mode at rates from 75 to 9,600 bit/sec and prints 132 col at 10 char./in. and 32 char./sec.

The unit is priced from $2,600 from DEC, Maynard, Mass. 01754.

Amtel Unveils Two Options For 'Messenger II' System

SAN FRANCISCO — Amtel Systems Corp. has announced two options for its Messenger II electronic mail/message delivery system.

Enhancements include a message light, which allows users to be added to the system, and an 80-col page printer that provides an appropriate message format for users receiving frequent, lengthy messages, the vendor said.

The message-light option costs $100. It flashes to let the user know when he has messages waiting, the vendor said.

The page printer is a microprocessor-controlled 80 char./sec unit that prints on fanfold paper. It is activated by messages sent from the message center or external communications networks like TWX or telex. The unit costs $1,990, the vendor said.

The firm also announced a device that reads messages from punched-paper tape and delivers them, in hard copy, to the recipients' desks. The unit costs $4,995, the vendor said from 1239 Anvilwood Ave., Sunnyvale, Calif. 94806.

CRT Display Introduced

SUNNYVALE, Calif. — Systel Corp. has introduced a CRT display with floppy disk storage that plugs into standard electronic typewriters, reportedly giving them word processing capabilities.

Systel II allows users to switch back and forth between regular typewriting and word processing without disturbing work in progress on the word processor, the vendor said.

The product combines a 12-in. diagonal CRT screen and a 5¼-in. disk. The screen provides 24 lines of 80-char. display on a nonglare green background.

Systel II is currently being offered for use with five models of electronic typewriters: Adler, Olivetti, Olympia, Remington Rand and Royal.

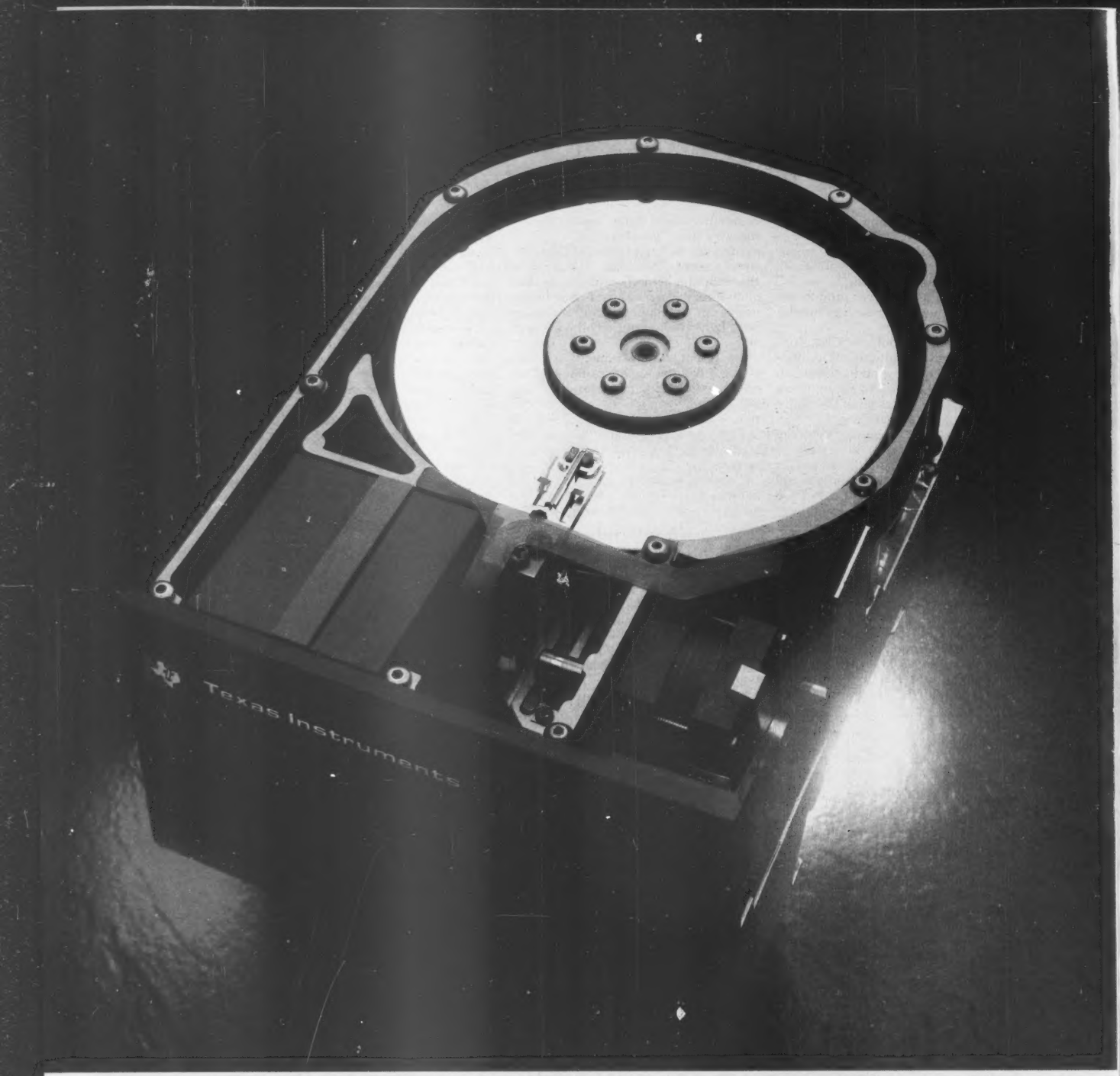
Systel II costs $3,500 from Systel at 538 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Device Gives Units Telex Capabilities

MOUNTAIN VIEW, Calif. — Chat Communications Corp. has introduced a device said to add telex machine capability to any word processor, personal computer, intelligent typewriter or terminal.

The Chat provides this access with plug-in compatibility, access through the host device's keyboard to Western Union domestic and international telecommunications networks and storage of all standard message formats, including telex, TWX, mailgram, cable and telegram.

The unit costs $1,495 from Chat Communications Corp., 2438 Wyadotte St., Mountain View, Calif. 94303.



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Adapso Drops Idea of Inquiry Into IBM Service

By Marcia Blumenthal
CW Staff

NEW YORK — Although the Association for Data Processing Service Organizations, Inc. (Adapso) has questioned the legality of IBM's reentrance into the service business with its Information Network, the trade organization decided at its recent management conference here not to make a formal inquiry into IBM's processing service activities for the immediate future.

In another move, the Adapso board authorized its CPA Relations Committee and legal staff to evaluate further the merits of a complaint that an unnamed small company has against a leading Big Eight accounting firm. In the past, Adapso has considered the complaints of several software and service firms for possible legal action against various certified public accounting (CPA) firms for unfair competitive practices, among other charges. But after review, Adapso counsel had deemed these cases too weak for legal action, according to an Adapso member attending the committee meeting. However, the complaint now under discussion by the board was considered promising and deserving of more study, the source noted.

Besides these issues, Adapso elevated two committees to full-section status.

(Continued on Page 72)

Prime Poised to Market Independents' Software

By Marcia Blumenthal
CW Staff

NATICK, Mass. — Prime Computer, Inc. has established a cooperative marketing program for independent software vendors. The program is designed to provide Prime users with applications software optimized for the full family of the firm's systems.

Called the Solutions Program, the new venture features a Joint Promotion Performance Pool that requires mutual investment between Prime and participating vendors. Under the plan, both Prime and the vendor will contribute funds for cooperative advertising, sales promotion, public relations, direct mail, educational materials, shared inquiry processing and trade show participation. The firm declined to estimate a range of investment required from vendors.

Although Prime started a joint marketing program for software vendors in 1979, the Solutions Program is the first to require financial investment by both parties, John Logan, manager of the new program, said. To date, Prime has signed only one agreement, but plans to have 25 participants in the program by the end of the year. Henco, Inc. is the first company to sign a cooperative agreement with Prime for the joint marketing of Henco's relational data base management system called Info.

A major feature of the Solutions Program requires Prime to do technical review and benchmarks of independent software vendors' products. Prime will evaluate those products with current users of the package, Logan explained.

The software houses participating in the venture will not sell Prime hardware. Prime has an authorized dealer program whereby Prime sells hardware on an OEM basis to dealers who, in turn, develop appropriate software products. However, the Solutions Program is the first to require a technical review of the products, Logan said.

When a sale is concluded, the software company retains all revenue from the sale of the software system.

In establishing the partnership program, Prime also hopes to motivate independent software firms to interface their packages, Logan said.

Prime has limited the scope of the venture to applications software, but the firm is not looking for specific vertical or industry packages. The firm said that there are currently 600 packages provided by 200 vendors. However, while Prime maintains a list of such packages for its users, these products will not be included in the Solutions Program, Logan said.

Fairchild Giving 'Telecommuting' a Try in Phoenix

By Robert Batt
CW West Coast Bureau

PHOENIX — Fairchild Camera and Instrument Corp. has opened a software development center here that the company said is its first attempt at employing telecommuters.

The 1,800 sq-ft facility is tied directly to the company's computer operation centered 700 miles away in San Jose, Calif., and according to Fairchild officials, the Phoenix staff is able to participate in internal meetings with their California counterparts without leaving their offices.

According to Jen Brain, director of software development for the company's General-Purpose Large-Scale Integrator Division (GPLSI), for all practical purposes, the Phoenix employees appear to be in San Jose. "They get their departmental mail on terminals and participate in engineering and programmers' meetings from their terminals in Phoenix," he added.

The Phoenix facility, which currently employs eight software engineers, was designed to develop software for the company's line of automated testing equipment used in semiconductor and computer manufacturing. The programmers are tied directly to the company's Digital Equipment Corp. VAX system in San Jose via terminals, dedicated telephone lines and 4.8K bit/sec modem.

The concept of telecommuting working in one place and doing jobs formerly performed elsewhere is still a fairly new concept in the industry. Nevertheless, it is expected to grow rapidly and an estimated 15% of the work force (10-million people) are expected to be telecommuting by the 1990s [CW Extra, March 17].

"What we are doing here may be the forerunner to establishing a cottage industry once we have learned how to manage the concept," Larry Kenan, Fairchild's Phoenix software operation manager, said.

"When we have learned how to manage applications for large products, people could conceivably work in their homes remote to their office locations," he added.

In setting up the facility here in Phoenix, Fairchild was faced with the problem of handling a great deal of interaction with its San Jose headquarters without incurring high expenses.

Engineers are required to attend numerous meetings as they develop development tools for new products, particularly, in the Fairchild case, pro-

(Continued on Page 72)

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Adapso Authorizes Investigation of CPA Firm

(Continued from Page 71)

These units are the System Integrators interest group headed by Arthur Kramer, general manager of Xerox Computer Services, and the Professional Services group headed by Jay Goldberg, president of Software Design Associates, Inc.

On the issue of IBM's Information Network, the Adapso board discussed a number of possible actions it could take to obtain a clarification of IBM's position in the services industry, according to Richard Crandall, chairman of the group's long-range planning committee and president of Comshare, Inc. Adapso has questioned whether the 1956 Consent Decree, which requires IBM's participation in the processing services business to be an "arm's length" operation, is still valid in light of the government's dropping its antitrust suit against IBM in January.

"There was never a point at which a lawsuit was concluded as an alternative," Crandall reported. He added that currently Adapso considers direct discussions with IBM the most productive alternative.

Unfair Competitive Edge

As for relations with accounting firms, Adapso has argued that CPA firms that offer management advisory services, including software programs and processing services, have an unfair competitive advantage over independent service industry firms. Adapso wants any software and service activities done by CPA firms to be completely separate from the audit business of the accounting firms.

In addition to contemplating becoming a codefendent in a particular legal action, some Adapso members have been engaged in unofficial discussions with representatives from a number of CPA firms, an unnamed Adapso member noted.

He reported that a survey of Adapso members revealed CPA firms were considered the second most significant source of competition for Adapso members; and would, in the near future, be rated the number one competitors.

'Telecommuting' Hits Phoenix

(Continued from Page 71)

totype mainframes and the microprocessors attached to them.

"Using the principle of telecommuting, there are a lot of meetings which we are now able to attend remotely and this saves a lot of time and expense. The material to be discussed is transmitted over our communications lines and printed out before the meetings so that we have access to the relevant documentation," Kenan explained.

He argued that the computer industry has matured greatly over the last few years in the area of structured design and documentation, giving rise to the tools that make telecommuting possible.

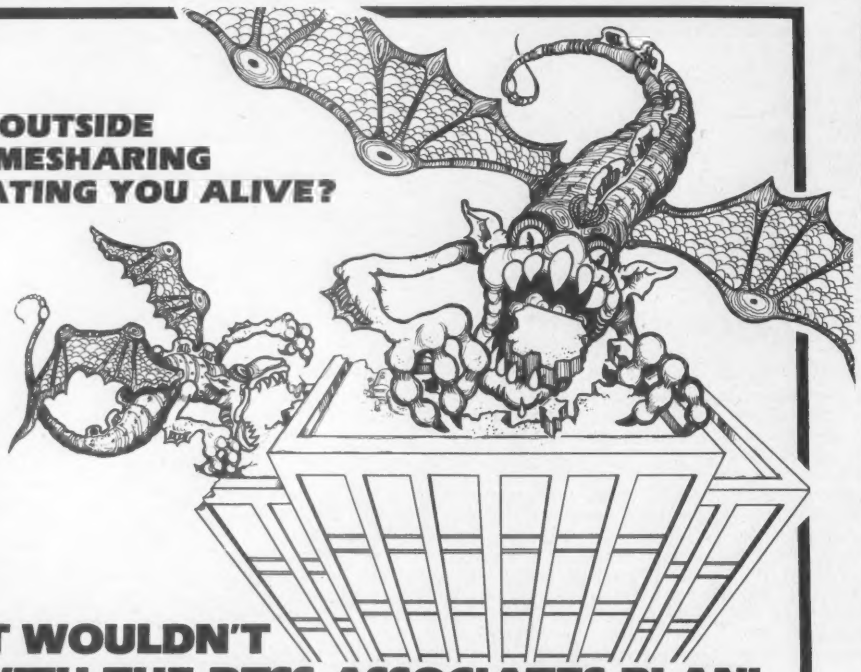
"We have to rigorously apply structured design techniques and take the process step by step so that each step adds a new level of detail to the one before it. This type of approach results in substantial productivity gains by reducing the amount of time needed before introducing a new product," Kenan asserted.

Fairchild claims such an approach can have ramifications across the corporation. Specifications for software models developed in Phoenix, for example, are made available to the company's engineering divisions nationwide via network communications links. "We can distribute information, collect responses and any number of other iterations without the need for face-to-face meetings," Kenan claimed.

For example, recently the Phoenix operation compiled a document on "Principles of Operations," which was compiled with inputs from all of the company's hardware and software divisions. The information was collected and disseminated using the telecommuting system.

But Kenan warned there are considerable management problems to be overcome before telecommuting becomes widespread. The instant transfer of information, he argued, necessitated the need for a centralized data base into which distributed processing facilities are closely tied.

Nevertheless, he concluded, "It seems pretty clear now that the work environment is more effective if people work in small groups rather than in large ones. The industry is simply waiting for cost-effective tools to make telecommuting commonplace."



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General Business Computers, Inc. recently moved to larger quarters at 2 N. Olney Ave., Cherry Hill, N.J. 08003, adding 7,000 more sq ft of office and warehousing space to its operations.

Modular Computer Systems, Inc. has opened an education center in Fort Lauderdale, Fla. The 22,000 sq-ft facility is located at 5100 N. State Road 7.

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Good News Balanced by Bad in Irish Industry

• *Industrial Incentives, Irish Work Force Produce 10-Year Boom*

By Marguerite Zientara
CW Staff

DUBLIN, Ireland — After stepping off an Aer Lingus jet in Dublin, the first message a visitor sees is "Welcome to Ireland, the most profitable industrial location in Europe."

And if the visitor is keen on finding out whether this is just blarney, he should ask Ireland's Industrial Development Authority (IDA) more about U.S. electronics businesses that have established operations in the Emerald Isle. The message, which is IDA's slogan, is soon translated into the specific statistics, tax breaks, government grants, a low wage scale and high population growth.

The IDA is an autonomous state agency whose mission is to provide industrial incentives for companies to locate factories in Ireland. Among its lures are a maximum 10% tax rate for manufacturers (guaranteed until the year 2000), plant financing assistance, outright grants of up to 50% and training grants of up to 100%.

Also attractive to the foreign manufacturer is tariff-free access to the European Economic Community (EEC) and long-established links with Africa and the Middle East.

Proof of Ireland's attractiveness as an industrial location — and IDA's success as a promoter — lies in the fact that a mere 10 years ago there was no electronics industry to speak of here, while today more than 130 foreign electronics firms manufacture here.

Among the computer-related manufacturers are Amdahl Corp.; Analog Devices, Inc.; Apple Computer, Inc.; Centronics Data Computer Corp.; Computer Automation, Inc.; Data Terminal Systems, Inc.; Digital Equipment Corp.; Documation, Inc.; Mostek Corp.; Perkin-Elmer Corp.; Prime Computer, Inc.; Varian Associates; and Wang Laboratories, Inc.

Moreover, software development, which is not considered a manufacturing operation, also comes under the 10% maximum tax rate. Software development activities have only begun to be established here in the past two years, although the republic welcomes such ventures with open

(Continued on Page 74)

• *High Taxes, Inflation, Unemployment Top Workers' Problems*

By Marguerite Zientara
CW Staff

DUBLIN, Ireland — In the face of glowing statistics meant to attract U.S. industry to Ireland there exist some less than pleasant realities that cannot be ignored.

It is true that Ireland has one of the highest reinvestment rates in the world. Furthermore, the average annual increase in U.S. industrial investment in Ireland over the past four years has been 41% — three times the average increase in the European Economic Community as a whole.

In addition, U.S. companies operating in Ireland have earned the highest rate of return on their investment "than anywhere in the world," according to Ireland's Industrial Development Authority (IDA).

So what's the bad news? A 19% inflation rate, high personal taxes for Irish workers, unemployment, an absence of privacy legislation and an imperfect road system.

Most of these aspects of Irish business will not pose problems for U.S. companies that locate here, but rather represent the somewhat repressive social climate of the country. In short, it is the workers who suffer.

For example, because of the high personal tax rate imposed by the Irish government, it is not worthwhile for factory workers to work overtime, according to Alec Wrafter, managing director of Apple Computer, Inc. in Cork.

Wrafter's enlightened operation includes Apple training courses for workers and tries to educate workers in basic economics for the good of the company. "However, once a worker learns the economics, he can't help but know that it is not worth it for him to work overtime because of the high rate of taxation

(Continued on Page 74)

Trilogy's IBM-Compatible System Said 'On Target' for 1984 Debut

DUBLIN, Ireland — Trilogy Ltd. — founded by Dr. Gene Amdahl, Carlton Amdahl and Clifford Madden — expects its IBM-compatible, high-performance, general-purpose computer to be on the market by late 1984.

On the morning of the groundbreaking ceremonies for the manufacturing plant at Blanchardstown, County Dublin here recently, Gene Amdahl stirred but did not remove the veil of secrecy surrounding Trilogy's very highly integrated computer technology. Emphasizing that the four-year production plan for the machine is "on target," Amdahl said only that the computer would feature emitter-coupled logic circuitry and would have "a factor of three improvement in performance" over any computers existing in 1984.

In addition, Amdahl claimed the machine will be more than twice as fast as the fastest competing commercial computer in 1984.

Over the next four years, Trilogy will spend $160 million on the project, most of which is committed or in hand, Amdahl indicated. Trilogy will make its own logic, but will buy memory from commercial sources. The company initially will use 64K-bit chips, but by late 1985, 256K-bit chips will be available for production equipment, he said.

Designed to compete with the products of Amdahl's former company, Amdahl Corp., which he left in 1980, the machine will feature "a much higher level of technology than Amdahl machines," he said.

In Trilogy's attempt to "win control of the architectural fashion of the future," its software-based fifth-generation technology will feature what Amdahl called "epicode — a new form of releasing microcode, though much higher than microcode."

And what are Trilogy's chances of success in winning that architectural control? "They're not zero," Amdahl said, "but they're not high yet either."

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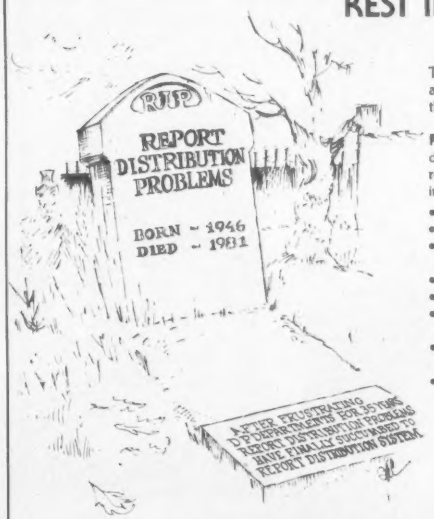
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High Taxes, Inflation Top Irish Workers' Woes

(Continued from Page 73)

imposed," Wrafter said.

Known as hardworking, enthusiastic and inspired workers, the Irish find themselves caught between ambition and economic reality.

Management, too, of course, can be hurt by their staff's realization that more work is not necessarily beneficial.

Irish branches of U.S. computer firms are trying desperately to prove themselves capable of research and development — not just manufacturing — and to that end, they are reaching extremely high levels of productivity helped by the innate team spirit of the Irish.

Unfortunately, workers' awareness of their paradoxical situation may eventually cut output and lower morale. "The Irish government has got to decide whether it is really committed to industrial development and adjust its policies accordingly," Wrafter said.

Ironically, the push in technical education in Ireland has resulted in a glut of technological expertise. An estimated 60% of the country's science and engineering graduates still must go abroad to find jobs and are reportedly eager to return to career opportunities at home.

Populace Unaware

In spite of the industrial revolution Ireland has undergone, especially in electronics in the last decade, the populace apparently is largely unaware of the possible dangers of the technology.

Altergo Ireland Ltd. (UK-based), for one, offers a debt-collection software system that activates threatening letters to alleged debtors, according to a company spokesman. No protests have been made against automated dunning to date. "Apparently, mistakes have not been made in sufficient quantity yet," Wrafter surmised.

If anyone were to question the Irish police about their use of computers in law enforcement, they would not get an answer, according to the observer, although it is generally known that they are used. Do the Irish care? "They are not sufficiently well educated on the problem," he said.

While Ireland is very well connected to the rest of the world through shipping and air channels, its internal road system is not quite as sophisticated. Travel between major cities often involves driving through small, congested towns, although a fast, modern highway exists from Shannon to Dublin.

From Cork to Shannon, however, the way is more bucolic than businesslike. It is said that if someone from Cork is in a hurry to fly from Shannon Airport, he risks not only the plane's crashing, but his untimely demise during the twisting drive from Cork to Shannon.

And while such a Cork-Shannon highway would certainly be efficient, gone would be the captivating charm and beauty of the necessarily slower drive past brooks, meadows, castles and an occasional horse-drawn cart.

With Ireland's environment being touted as one of its drawing cards, one may wonder whether the industry it attracts will eventually erode its beauty.

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Incentives Spell Industrial Boom

(Continued from Page 73)

arms and a generous pocketbook.

U.S. software development firms here include Cincom Systems, Inc.; Measurex Corp.; Four-Phase Systems, Inc.; TSI International, Inc.; Comserv Corp.; Inslaw, Inc. and Micropro International Corp.

It is noteworthy that the average hourly wage cost in Ireland, including all social costs, is $6.14/hour, vs. $11.87 in the U.S. Combined with the reportedly high productivity of Irish workers, such costs are said to offer a manufacturing cost advantage.

Educated Personnel

Besides financial incentives, Ireland also offers a pool of educated, English-speaking personnel, including technicians and technologists, according to IDA.

College-level technical training in Ireland will produce 400 electronic engineers, physicists and computer scientists in 1982, according to IDA, and that number is expected to rise to 637 by 1985.

Besides the five universities of Ireland, technical training is given at Dublin's two Colleges of Technology and Ireland's two new National Institutes of Higher Education as well as nine secondary-school-level Regional Technical Colleges, IDA explained.

In a country where 50% of the population is under 25, and a third is under 15, technical education is "the key to future success here," according to Declan Glynn, IDA's Electronics Division manager.

One of the benefits of the industrialization of Ireland is improved telecommunications for Irish DPers. By 1985, the telecommunications system is scheduled to be fully digital, following a $1.5 billion improvement program. The system will be the only fully digital system in Europe, IDA claimed.

For Service Firms

Graphics, Videotext Seen as Lines of Expansion

By Marcia Blumenthal
CW Staff

NEW YORK — Graphics and videotext are two opportunities for computer service firms looking to expand the scope of their services, according to industry executives whose companies are already exploring those new avenues of service.

Last July, Comshare, Inc. formed a graphics business unit and is now ready to launch its first major graphics product called Commander Executive Management Reporting (EMR), Peter Berg, vice-president of graphics, explained.

Speaking at the management conference held here recently by the Association of Data Processing Service Organizations, Inc., Berg said executives want to treat all corporate data bases as one data base. The software for Commander EMR resides on an IBM VM-based system and can interact with internal or external data base extracting information that is then transformed to chart format.

To minimize the impact of computers entering the executive suite, Comshare's terminal is a TV set with a hand-held calculator-type device replacing the keyboard.

The system also accepts alphanumeric information from word processors for display on the EMR terminal, and it will accept "what if" data from personal computers, he added. Of the 1.6 million personal computers installed, about 900,000 are in business, so vendors must explore the use of a graphics system combined with a personal computer, Berg advised.

Besides graphics, videotext is another computer service firms should consider as a long-term opportunity, according to Alan Brigish, president of Information Systems Marketing. There are enormous parallels between what time-sharing was for the 1970s and what videotext will be for the 1980s. Both services require terminals, computers, software and data bases. Despite the similarities, videotext does not yet have a great market attraction, Brigish said. Instead, the technology will push the market rather than the market demanding the product, he added.

Although videotext is usually thought of as a consumer product, it has great opportunity for business, Brigish maintained. He cited one group of farmers using the service through a bank in Minneapolis. Through this system, these farmers can access business loan information, the futures market for agricultural products, trend information about specific crops such as wheat and weather forecasting information.

As yet, no one company has all the pieces necessary for offering videotext services. Consequently, there will be a rush for joint ventures among a wide range of companies in the computer, communications and information industries, he predicted. These include hardware companies, software firms, graphics companies, cable TV and other broadcasters, newspapers and directory publishers.

New Companies

Professional Computing & Consulting Services, Inc. offers custom computer software, programming and consulting services for users of small and large-scale integrated data base management systems. The firm can be reached through P.O. Box 15534, Orlando, Fla. 32858.

Young & Associates, Inc. is a public relations agency specializing in marketing and media liaison for the information and telecommunications industries. The firm is located at 6187 Executive Blvd., Rockville, Md. 20852.

TUL Software Associates, Inc. will market products for the Wang Laboratories, Inc. 2200 series computer. The firm is located at 8209 E. 63rd Place, Tulsa, Okla. 74133.

Comsult, Inc. is offering systems design and custom programming for a wide spectrum of software applications. The firm is located at Suite 1A, 500 Lowell Drive, Huntsville, Ala. 35801.

ISE International announced the formation of **International Software Enterprises, Inc.**, an international company offering software and services to the microcomputer community. Inquiries may be sent to ISE-USA, P.O. Box 248, Lafayette, Ind. 47902.

Digital Transactions, Inc. will specialize in low-cost, easy-to-use office automation systems for small businesses and small departments within large businesses. Corporate headquarters will be established in Fairfield County, Conn. Additional information is available from Charles W. Murphy, Suite 6K, 88 Lexington Ave., New York, N.Y. 10016.

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IBM Compatible

IPL Plans Mitsubishi CAD, LSI for Processor

WALTHAM, Mass. — IPL Systems, Inc. announced plans to develop an IBM plug-compatible processor using the computer-aided design (CAD) system and large-scale integration (LSI) circuitry developed by Mitsubishi Electric Corp.

Although few details were available on the cooperative arrangement, IPL said the system would not be a replacement for, but an addition to, its family of IBM-compatible systems.

IPL will design the chip logic for the system and Mitsubishi will fabricate the chips using its CAD system and LSI technology, according to Paul McDonald, IPL director of finance.

Mitsubishi initially will not manufacture the new system, McDonald said. However, depending on how the arrangement works, "additional discussions" on manufacturing could be held.

The compactness of LSI circuitry does not allow easy changes after design. The chips, therefore, must be created using CAD techniques. This method permits simulations of the performance of the circuit to be run prior to the final design change, McDonald noted.

IPL declined to elaborate on the financial arrangements between the two firms or when the processor would be finished. McDonald said the firm does not yet have a clear idea of the eventual product.

The firm also declined to discuss which firm made the initial overture for the joint development arrangement.

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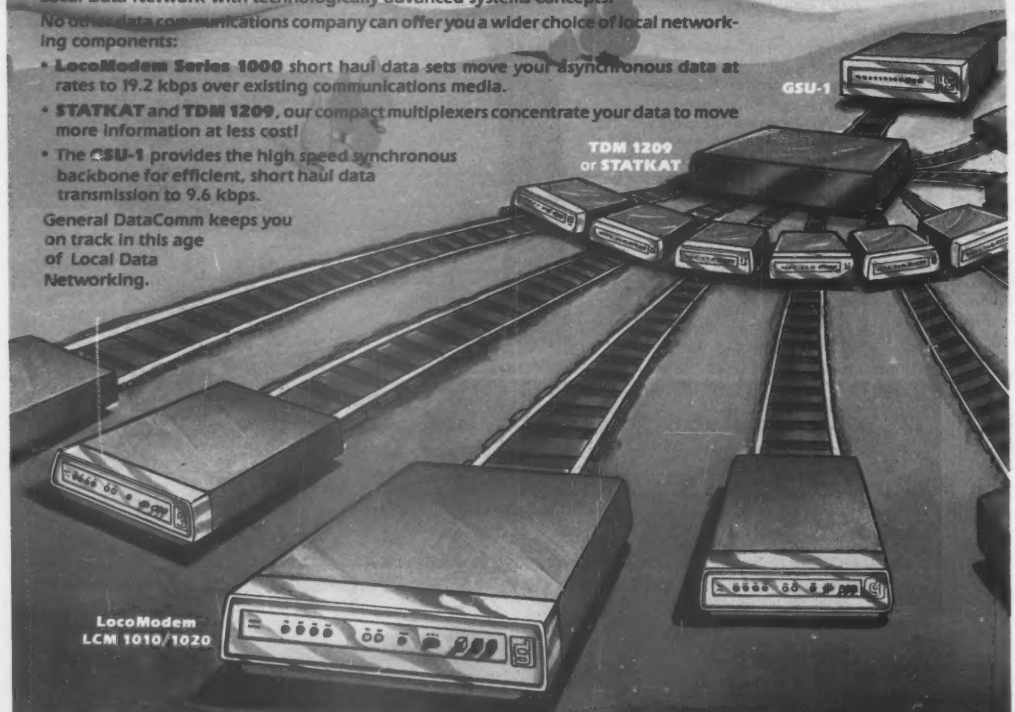

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Burroughs, Hitachi Discuss Deal

TOKYO — High-level executives of Hitachi Ltd. reportedly visited Burroughs Corp. last week to discuss the possibility of jointly developing semiconductor and computer-related technology and the purchase of Hitachi's high-end computers, according to an industry source here.

Besides high-end systems, the two firms were said to have discussed Burroughs' purchase of I/O equipment from Hitachi.

According to a Japanese industry watcher, Hitachi has indicated it has the capability of modifying its large-scale computers to run the operating system of Burroughs high-end models of its B7800 line.

Burroughs declined to comment on whether it is currently in negotiations with Hitachi. However, a spokesman from Burroughs said that the firm is not considering the purchase of large-scale mainframes from any firm.

Burroughs Earnings Up 22%

DETROIT — Burroughs Corp. reported a 31% increase in revenues and a 22% gain in earnings for its first quarter.

For its first period the firm earned $27.1 million or 65 cents per share compared to earnings of $22.3 million or 54 cents per share in the same period a year ago, the firm said.

Revenues for the initial quarter were $990.1 million, up from $756.5 million a year ago.

Despite the gains, the Burroughs Chairman and Chief Executive Officer W. Michael Blumenthal estimated that first-quarter earnings were reduced by 20 cents per share because of adverse currency exchange ratios.

The quarter's results included the operations of Memorex Corp., according to Burroughs. Memorex became a free-standing subsidiary of Burroughs in December.

Incoming orders, not including the contribution of Memorex, remained essentially flat when compared to the first quarter of 1981, according to a Burroughs spokesman.

Commenting on the firm's stepped-up asset management program, Blumenthal said Burroughs reduced its debt by $40 million during the quarter.

Exec: Japanese High-Tech Strength Exaggerated

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The outlook for Japanese strength in world electronics markets may be greatly overestimated, according to one industry observer who sees a combination of international protectionism and Japan's domestic economic problems slowing the pace of that country's technological development.

Japan's stagnant economy may do as much to ensure the supremacy of U.S. electronics firms in American and international markets as the technological strength of U.S. firms, McGraw-Hill Vice-President Lewis H. Young said here recently.

Young's observations were based, he said, on six trips to Japan during the last two years. Young told a conference of the Associated Information Managers (Aim) that despite the success of Japanese firms in semiconductors and certain equipment fields, that country does not pose the great and imminent competitive threat that is often suggested in the press.

"They have some very serious problems over there, one of which is that their economy has stopped growing," Young said.

He stated Japanese economic growth over the last two years has been largely the result of increased exports.

Restricted Markets Seen

Young, editor in chief of *Business Week*, suggested that because of a worldwide backlash against Japanese imports — a movement fueled by sluggish economies in the major industrial nations — Japanese companies will see more and more markets closed to them or at least severely restricted.

With slow growth of international and domestic markets for their products, Japanese firms will be hard pressed to continue the recent trend toward greater automation and productivity.

Young said he foresees a resulting confrontation between historically cooperative labor unions and managements that are trying to replace workers with robots and other forms of automation.

And because the average age of the Japanese population is increasing, the salary content of the country's products will increase and hurt their competitiveness in markets that remain available, according to Young.

He said it is important to see the concerted Japanese move into information technologies as not just a strategy for economic strength but as the only realistic alternative for that country.

He explained that Japan has relatively little raw materials and even less energy sources. Therefore, he said, the Japanese had to develop a high-technology, information-based plan for the future because they had no other choice.

Unfortunately for the Japanese, he added, they have only mixed prospects for beating Western countries in this strategy.

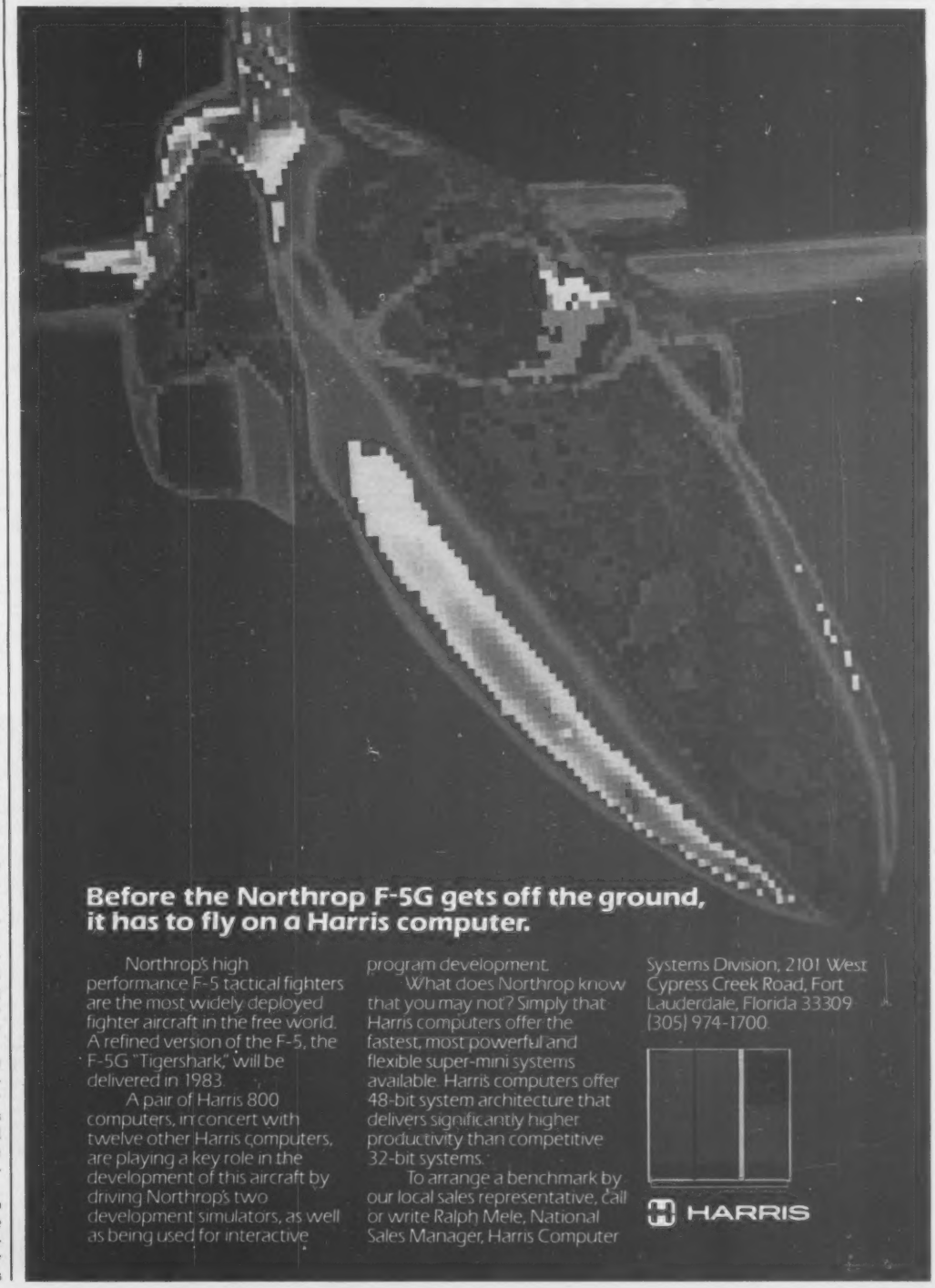
"The U.S. leads the Japanese considerably in this area of information," according to Young, who noted "they think differently than we do."

This cultural difference, he continued, means the Japanese may have less success than American firms in providing the software and services that are the keys to the future of information technology.

Japanese firms' manufacturing expertise has helped them gain footholds in many international equipment markets, but data base services and specialized software that American firms see as the key markets of the future will be more difficult for the Japanese to enter, let alone dominate, Young explained.

Young pointed out that many succeessful Japanese forays into international markets have been possible only through joint ventures with established companies. He sees the Japanese having continued difficulty breaking into U.S. markets on their own.

This, he said, puts them at a decided disadvantage when competing against American firms.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Supershorts

Digital Equipment Corp. is delaying plans to build a new, $6-million plant in Rhode Island and a manufacturing plant in New Hampshire because of the recession. Lagging sales have caused the delay of these and two-dozen other projects.

— — —

Piezo Electric Products, Inc. (Pepi) and the General Electric Co. have reached an agreement in principle to grant GE a nonexclusive license and rights to the Pepi patent base and Piezo manufacturing technolgy for $2.5 million.

— — —

Advanced Micro Devices, Inc. and Thomson Efcis (Paris, France) have announced plans to enter into a five-year, reciprocal alternate-source agreement. The agreement covers digital bipolar families and associated high-performance bipolar memories, data conversion and telecommunications circuits as well as microprocessor peripherals.

— — —

Computer Sciences Corp. and Security Pacific National Bank have entered into a joint-venture agreement to process payrolls for the bank's customers. Security Pacific is the nation's 10th largest bank and the five-year contract is valued at more that $35 million.

— — —

Ramtek Corp has acknowledged that it is negotiating an OEM contract with Digital Equipment Corp. under which Ramtek would sell some of its products to DEC. Negotiations have not been completed and the volume of business that would result from the contract is not known.

— — —

U.S. Data Corp. announced the establishment of a Communications Systems Division to provide turnkey data communications solutions utilizing off-the-shelf hardware from various manufacturers.

— — —

Canadian-based Datacrown, Inc. announced the opening of a $10-million computing center in Silver Spring, Md., to serve its U.S. clients. Datacrown is a subsidiary of Crown Life Insurance Co.

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The David Jamison Carlyle Corp. (DJC) will set up an "employee computer store" for Storage Technology Corp. through which employees may purchase, at a corporate discount, any microcomputer system carried by DJC.

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Orders & Installations

Reaccs Stores, Gets Chemical Reactions

HAYWARD, Calif. — Molecular Design Ltd. has begun marketing its Reaction Access System (Reaccs), a graphical data base management system for storage, search and retrieval of chemical reactions.

The company claimed the system is the first of its type for storing and retrieving chemical reactions and as such is a major advance in computer-assisted chemistry.

The first system has already been installed at the Kodak Co.'s Synthetic Chemicals Division in Rochester, N.Y., where it is used to enable chemists to create new reactions by learning how related chemicals were previously made.

Reaccs, according to Molecular Design, provides automatic graphics display of reactions and associated data such as references, conditions, reactant and product quantities, solvent and catalyst properties.

Kodak reported it will use Reaccs to catalog more than 20,000 structures and 15,000 reactions, adding new information to the file as is developed in the laboratory. Previously, Kodak relied on manual notation and retrieval to document research into chemical reactions.

Other Orders

Sperry Corp.'s **Sperry Univac Division** has installed a $1-million 1100/61 computer system for **Reynolds, Smith and Hills, Inc.** of Jacksonville, Fla.

Digital Communications Associates, Inc. has received an order from **Dun & Bradstreet** of Berkeley Heights, N.J. for eight System 355 master network processors. The order is valued at approximately $220,000.

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SSSA CW 4/26

Mergers & Aquisitions

AM International, Inc. announced the sale of its Jacquard Systems Division to **Applied Technology Ventures** of California. Terms of the agreement were not disclosed.

Data Systems for Industry has announced the acquisition of a majority interest in **Online Designs, Inc.** of Birmingham, Mich. Management within both companies will remain the same.

Transnet Corp. announced an agreement in principle to acquire **Edumatics Corp.** of Wall, N.J. Assuming completion of the merger, shareholders of Edumatics will receive approximately one share of Transnet common stock for every five shares of Edumatics common stock.

Software International Corp. (SI) has purchased Software Resources, Inc. of Salt Lake City, Utah. The acquisition was made to solidify SI's position as a major independent supplier of financial software for Sperry Univac systems.

Gould, Inc. has announced completion of the acquisition of **Bryans Southern Instruments Ltd.**, Mitcham, Surrey, England. Bryans will become part of Gould's Instruments Division.

McDonnell Douglas Automation Co. has announced plans to acquire the operating assets of the Medical Systems Division of **Tymshare, Inc.** The acquisition will be operated as part of the Health Services Division of McDonnell Douglas Automation and the Computer Services Division of McDonnell Douglas Corp.

Comsat General Integrated Systems, a wholly owned subsidiary of Comsat General Corp., has acquired **Graphix Software, Inc.**, a Florida-based company that specializes in the development of computer-aided software products.

Associated Technologies, Inc. (ATI) has acquired DIS/ADLPipe from **Arthur D. Little, Inc.** DIS/ADLPipe, which will become a corporate subsidiary of ATI, will continue to develop and market software products for the integrated design and construction of power and process plants.

Balance Computer Corp. has entered into an agreement in principle to acquire **Clinical Evaluation Specialists, Inc.** and **Michigan Rand Corp.** The companies, which provide medical examination evaluations and reports to law firms and insurance companies, will be merged into a wholly owned subsidiary of Balance.

Group III Electronics, Inc. has acquired **Pacific Northwest Electronics** through a merger involving an undisclosed exchange of stock. A distributor of computer peripherals, Group III Electronics now has sales and service facilities in eight locations throughout California, Oregon and Washington.

General Electric's broad line of data communication equipment for lease now includes MICOM's new Micro800 data concentrator.

The Micro800 is an intelligent multiplexor that allows you to run up to 16 asynchronous data terminals through a single telephone line, error-free—with better than double the efficiency of a conventional TDM.

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Contracts & Pacts

Indeserv, a third-party maintenance firm, has signed an agreement with Stratus Computers, Inc. of Natick, Mass., to provide nationwide maintenance to the Stratus/32 Continuous Processing System.

NCR Corp. has signed an agreement with Bitek International Corp. to market Bitek's Telephone Accounting System for hotels and motels. NCR will also service the system.

Computer Automation, Inc. has received a $1.15 million contract from Tricom Systems Corp. for its Scout minicomputers. The computer systems will be used in Tricom's automated dispatching systems for automotive and truck service centers.

Cortex Corp. has signed a contract with Microproduct Technology Software, Inc. to develop a semiconductor manufacture and control package, MTS-100, using Inform, a fourth-generation applications development language.

POSITION ANNOUNCEMENTS

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In this position you will perform all aspects of producing user and internal documentation for Field Engineering software products. Responsibilities include establishment of style and standards, the coordination of documentation schedules with software release schedules, interface with users and software development staff to establish documentation content, write documentation and coordinate printing and distribution.

STC offers an excellent benefits package which includes health, dental and life insurance, stock purchase plan and much more. If you qualify for any of the above positions and would like additional information concerning them and other software openings, please call Dan O'Reilly, (303) 673-4545 or send your resume to him at Storage Technology Corporation, MD 29, Dept. 4/26 #38, 2270 S. 88th Street, Louisville, Colorado 80027-0098.

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Flourish with the explosive growth of our young, dynamic organization, and unharness the limitations of your career in the following long-term opportunities:

APPLICATIONS DEVELOPMENT

Applications Managers

Challenging openings exist in several areas (Operations Systems, Marketing Systems and Financial Systems) for Managers who can insure the smooth operation of our busy Systems & Programming Applications Department. Positions require a minimum of four years experience in Data Processing, with Operations, Marketing or Financial applications, proven management track record and experience in project management and structured design techniques. (Please refer to Job #CW01).

Senior Analysts

Reporting to the Applications Manager, you'll be responsible for the design and development of many new and exciting state-of-the-art systems.

Previous project leadership experience and a strong background in project management methodologies is essential. Four or more years experience in the design of Operations, Marketing, or Financial Systems in an IMS/DB and CICS/DL1 on-line environment, along with a working knowledge of structured design and programming techniques is required. (Please refer to Job #CW02).

Change Control Manager

Reporting to the Director of MIS, you'll utilize your take-charge skills to supervise a Documentation Specialist and Programmer/Analyst. You'll be responsible for the overall quality control function within MIS and have final approval authority on the implementation of new systems and programs.

Data processing management background plus experience on large-sized data processing projects essential for this highly user-oriented position. (Please refer to Job #CW03).

Programmer Analyst/Change Control

Reporting to the Change Control Manager, you'll be assisting with technical aspects of maintaining quality control in the implementation of new systems and programs. Three-five years practical applications and systems experience in Assembler and COBOL essential. (Please refer to Job #CW04).

Manager/Technical Support

Move into the management of all systems programming for the site, including teleprocessing, operating systems, compilers, network management, data processing & data communications. Your five years related experience, including two years in a managerial capacity will make you ideal. (Please refer to Job #CW05).

Data Base Administrator

Take charge of the development of an integrated data base of sales information and order history. Two-four years experience with IBM COBOL programming or systems programming essential. (Please refer to Job #CW06).

COMPUTER OPERATIONS

Operations Supervisor

Utilize your knowledge of hardware and operating systems configuration as you take on the responsibility for supervising a team of operators on assigned shifts. This is a highly visible position reporting to the Operations Manager and requires OS/MVS experience and five or more years experience in a large, mainframe IBM computer environment. (Please refer to Job #CW07).

Lead Communications Operator

Reporting directly to the MIS Engineering Manager, you'll work in liaison with the Computer Operations Manager to install communication equipment including modems, lines, terminal controllers, video terminals, remote printers and all analysis equipment in the Host location. Minimum three-five years experience working with large network systems desired. (Please refer to Job #CW09).

Operations Analyst

Working directly with first line supervisors and other managers, you'll be responsible for assisting in the operation of a large-scale IBM computer environment consisting of IBM 4341s and 3081s. You'll need to be conversant with all aspects of computer operations and possess the ability to track and report productivity, and monitor the entire MIS environment. Five years of experience in large, mainframe IBM computer operation, and experience with network communications and distributed processing essential. MVS experience a definite plus. (Please refer to Job #CW08).

TRAINING

Training Manager

Reporting to the Director of MIS, you'll plan, organize, staff and manage the entire MIS training department, including establishing plans and budgeting. You must have four or more years experience in technical or data processing training department management. (Please refer to Job #CW14).

Standards Development Analyst

Working with the Training Manager, you'll participate in the development of MIS departmental standards for Computer Operations, Applications Development, Systems Programming, and Data Base Administration. This position requires three or more years experience in the development of technical and project management standards for a large MIS department. Superior written and verbal communication skills essential. (Please refer to Job #CW15).

Training Coordinator

You'll establish user department and MIS department training curricula. This will involve the set up of training plans, budgeting, vendor selection, class scheduling, reviewing and tracking results, and record keeping on career path training. Three or more years experience in an equivalent position necessary. (Please refer to Job #CW17).

User Trainer

Utilize your skills to participate in Data Processing projects and write user-related documents, manuals, procedures and terminal operator guides. Two or more yrs. data processing experience in the development of manuals, terminal operator guides, & other user-related documents essential. (Please refer to Job #CW18).

Openings Also Exist For:

LEAD COMPUTER OPERATOR — (Refer to Job #CW10).
COMPUTER OPERATORS — (Refer to Job #CW11).
I/O CONTROL SUPERVISOR — (Refer to Job #CW12).
HELP DESK OPERATOR — (Refer to Job #CW13).
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Position requires BS in Engineering, Computer Science or equivalent with significant experience in Process/Industrial Control Software using Fortran and Assembler on Mini and Micro-computers. Also requires knowledge of Manufacturing Processes and/or computer interfaces to physical environment. Experience with PDP or LSI/11 is helpful.

SENIOR SYSTEMS ENGINEER

Position requires BS in Information Systems, Engineering, Business or related field. Minimum of 10 years systems and programming experience. Experience with COBOL, CICS, TSO/SPF, "TOTAL" DBMS. Manufacturing Systems experience and Distributed Processing experience a must. Will work on MRP System analysis, design and implementation.

SENIOR SYSTEMS ENGINEER

The Scientific Applications group is seeking an individual with a BS in Computer Science, Math or Physical Sciences, with 3 - 6 years of experience in Scientific Programming and significant knowledge of hardware and software for both batch and interactive computer graphics. The individual will be responsible for development of applications for various graphic systems, recommending appropriate systems and assisting users in development of needed software. Will also assist in general scientific programming and provide user consultation.

CAD/CAM DEVELOPMENT ENGINEERS

Positions require an Engineering or Computer Science degree and at least 3 years experience in Mechanical Parts CAD/CAM Applications. Individuals will design and implement CAD/CAM Applications using microprocessors, mini-computers and mainframe computers for interactive graphics, automated process planning, direct numerical control, part classification and coding, and automation of process equipment. Working knowledge of computer hardware and wideband communications is desired in addition to software skills.

SYSTEMS PROGRAMMER

Position requires a BS in Computer Science or equivalent with experience in the installation and maintenance of NOS operating system and related utilities on Control Data Cyber computers.

SYSTEMS PROGRAMMER

Position requires a BS in Computer Science or equivalent with experience in installation and maintenance of Control Data Network products as installed on DCD 2551 network processors.

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You will be part of a team responsible for the implementation of packaged software (G/L,A/P,A/R) and the modifications of those packages to interface with other systems. Experience with Financial Applications is required.

SYSTEMS ANALYST MANUFACTURING APPLICATIONS

You will be part of a team responsible for the complete implementation of manufacturing systems, from feasibility study through implementation for plants in the U.S.. Minimum of two years experience in direct support of manufacturing systems.

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Your skills and experience with CICS and DL/1 in a VS environemnt (VS1 or MVS) can qualify you for a rewarding career with a dynamic unique organization. Order Entry or Billing applications experience a plus.

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Exceptional opportunity to be part of a new MVS/SP3 installation with JES2, IMS, CICS, ACF/VTAM and ACF/NCP on a 4341. Three years MVS/JES2 experience required, IMS, CICS, or NCP a plus.

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MVS system generation and maintenance experience. Good communication skills required for customer problem resolution. Exposure to industry software products desired. Familiarity with VS1 and VM helpful.

SYSTEMS SOFTWARE DEVELOPMENT

Programmers with strong Assembler experience and working knowledge of control blocks and internal flow of MVS, VS1 and/or VM operating systems.

PRODUCT COORDINATION

Systems analyst with two years analysis and writing experience to review customer requests and to produce software product specifications. MVS, VS1 and/or VM system experience with familiarity of OS internals. Excellent oral and written communications skills are required.

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We are offering an excellent career opportunity to a systems programmer with experience on IBM 4300 with DOS/VSE. Responsibilities include systems generation, evaluation and installation of packaged operating systems enhancements. Additional responsibilities may include management of telecommunications software and network. Competitive salary and benefits in a creative working environment. Qualified applicants should send resume, in confidence,to EDP/PERSONNEL:

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The individual selected to fill this position will be responsible for the management of the administrative systems support section of the Computing Center, and supervision of its four Systems Analyst/Programmers. The major goals of this section are development of new administrative computer systems and maintenance of existing systems. Long Range Planning will be a high priority.

We are looking for someone with a thorough understanding of the systems development process. The ability to set standards, train staff, and communicate with users is essential. Requirements include: Six years of professional experience in the area of systems analysis and programming, at least two of which reflect significant supervisory or managerial experiences. A Master's Degree and two or more years experience working in a college or university environment are desirable attributes. Starting salary will be commensurate with qualifications and experience.

Submit a resume by May 14, 1982 to:

George Boseia
Director of Computing
OBERLIN COLLEGE
Oberlin,OH 44074

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Company desires to employ analysts with experience supporting state legislatures. Applicant should have participated in the design and installation of computer systems for drafting of legislative bills and for search and retrieval of state statutes. Applicants should be familiar with current mainframe software used in these activities (such as ATMS/STAIRS). Excellent salary and benefit package. Please respond with salary requirements to:

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Required: at least 3 years experience including documentation writing, scientific programming and system design, applying numerical computation techniques, presenting seminars and workshops on software use and assisting others in software design and debugging. Extensive FORTRAN knowledge is required; experience with other languages, graphics systems and scientific subroutine packages desired. DBMS and array processing background is an advantage. A Bachelors in Computer Science or a related discipline is required with graduate work preferred.

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We offer a challenging work environment which includes an IBM 3033N/3032 with IMS/CICS. Tools supporting development are: TSO/SPF, ROSCOE, D.M.S., UFO, SAS, COBOL and DL1. Current needs exist for the following:

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Davonport, Iowa

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Unique opportunity to provide analytical, technical and general applications training and support to a project team. Position requires Bachelor's degree (or equiv.) Minimum of 2 years systems analysis programming experience in OS/VS1 and CICS. Responsibilities include software development for an IBM 3278 on-line network.

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In our recent Survey, which polled more than 50,000 computer professionals, new statistics about compensation differences emerged. Here is a sampling:

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- While length of experience in computing bears a direct relationship to compensation, type of experience is often a more critical factor.
- Some emerging technologies—microcomputer systems, for example—are having an unusual impact on compensation in the field.

Salaries for 48 positions are compared.

1982 salary data for 48 different position categories—at various levels of experience and computer installation sizes—are reviewed in the report. Included are positions in programming, software, systems design, data communications, mini/micro systems, data base, EDP auditing, computer marketing and more.

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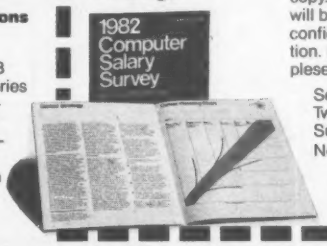

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New Hampshire College located on a beautiful campus environment in Manchester, N.H. is seeking an experienced Data Processing professional to assume the responsibility for the management of its IBM 370/4341 Centralized Computer Facility and distributed Data Processing capabilities. The director reports to the office of the President and will work closely with administrators and faculty to ensure the development and provision of computer support for management, instruction and research. Qualified candidates should have at least 4 years experience as a manager or assistant manager of a medium size facility with experience in on-line information system design; implementation and maintenance; and a thorough knowledge of large mainframe and micro data processing hardware, software and telecommunications. Experience with VM, DOS, CICS and Database Management Systems preferred. Only those with appropriate credentials will receive a response. Please send resume to: **Pamela Perkins, Personnel Office, New Hampshire College, 2500 North River Road, Manchester, NH 03104.**
EOE/AA

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FLORIDA INTERNATIONAL UNIVERSITY
MIAMI, FLORIDA

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Chairman
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919/876-4620

• ATLANTA
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3400 Peachtree Road, NE
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404/231-2253

DATA PROCESSING OPPORTUNITIES

Panhandle Eastern, a major energy company, is expanding our Kansas City, Mo., office. This expansion has created openings for additional experienced data processing people in the following areas:

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Duties include development and maintenance of software to support company applications. Experience in COBOL using structured techniques is required. Data base and on-line experience beneficial.

ANALYST/PROGRAMMERS

Must be experienced in the analysis, design, programming and implementation of commercial application systems. Data base and on-line experience preferred.

SYSTEMS ANALYST

At least 2 years application systems analysis and design experience on top of a strong application's programming background. Position requires user interaction, data base and on-line systems experience as well as problem solving techniques. Knowledge of system development methodology such as SPECTRUM or SDM/70 beneficial.

SENIOR ANALYST/PROGRAMMER

Strong written and verbal communication skills required as well as a proven ability to closely interface with users. Will be required to function in both a systems and business analysis capacity and make presentations to management. Project management experience utilizing either manual or automated project scheduling and tracking tools highly desirable; system development methodology experience required.

Each position requires a minimum of 3 years of large mainframe experience; Univac 1100 considered a plus.

Panhandle Eastern offers the opportunity for professional growth and development and job security through competitive pay and fringe benefits. Interested candidates are requested to send a resume or letter of qualifications to Sue McLeod.

Panhandle Eastern
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Kansas City, Mo. 64141
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Colgate University, a private college with an enrollment of 2,600 students, seeks to fill the position of Director of the Academic Computer Center effective May 31,1982 or as soon as a successful candidate is identified. The Director reports to the Provost and supervises a staff of three full-time employees. The Computer Center is equipped with a VAX 11-780 which is used exclusively for research and instruction. Primary languages used on the computer are PASCAL, BASIC, and FORTRAN. Qualifications include a Bachelor's Degree and five years of supervisory experience in academic computing or an appropriate combination of education and experience. Salary will be commensurate with experience and an attractive fringe benefit package is available. Applicants should send letter of application and resume with salary history, and references to:

Chairman
Computer Center Director Search Committee
COLGATE UNIVERSITY
105 McGregory Hall
Hamilton, NY 13346

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Send resume with salary history to: **Joan Doig, PRINCETON UNIVERSITY, Personnel, Clio Hall-I, Princeton, N.J. 08544.** *EOE/AAE*

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William Woods College, a private baccalaureate college for women, is seeking a Director for the campus Computer Center. Must be experienced with DEC equipment (DEC 11/44, RSTS/E) in all functions related to college requirements, including Data Base Mgt. System CAI, Business Systems, Academic Records and Advising, Financial Aid, etc. Experience with POISE desirable. New installation. No teaching. Position available immediately. Salary will depend upon training and experience as required. Forward application, including references and transcripts, to **N.L. Gerhart, Vice President, Business Affairs, William Woods College, Fulton, Missouri 65251. No telephone inquiries. Applications accepted until May 10.**
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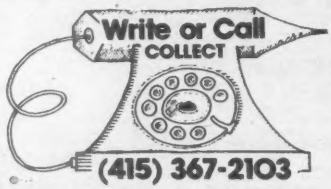

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Ford Aerospace & Communications Corporation
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Requirements:

- —7 years' directly related experience
- —Demonstrated skill in the analysis and design of large data base systems defining data relationships, data structures and search strategies.
- —Undergraduate degree in Computer Science, Math, Engineering, or other business and technical fields.

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Pat Mabutas
Bechtel
Employment Dept. 46-14
P.O. Box 3965
San Francisco, CA 94119

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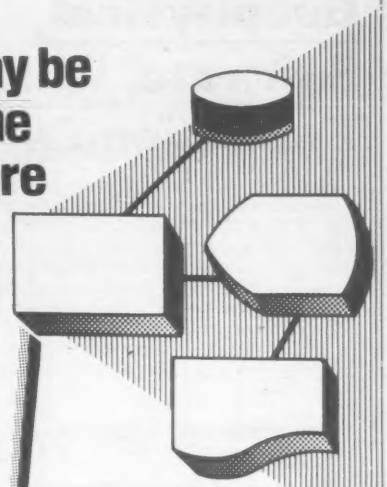
SYSTEMS ANALYSTS

The job title may be the same but the opportunities are far greater at MOHAWK DATA SCIENCES



- An innovative, state-of-the-art designer, manufacturer, and marketer of multi-function systems for distributed data processing, word processing, electronic mail, and communications.
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Our current expansion program has created exceptional opportunities in NYC, Philadelphia, Boston, Washington, Chicago, Detroit, Houston, Dallas, Los Angeles, and San Francisco.

At Mohawk Data Sciences, we believe that the bulk of the credit for our achievements must go to our people—highly motivated, dynamic professionals who have helped make us what we are today and have carved out exciting and rewarding careers for themselves.

To qualify, you should have 2-5 years' related experience in distributed data processing and data communications systems—preferably with a computer systems vendor. Require knowledge of at least one high-level programming language and experience in Assembly language programming. Communication emulators are definite pluses; familiarity with SNA/SDLC helpful.

Aren't we the company you're really looking for? For prompt consideration, please send your resume indicating area of preference and salary history/requirements in confidence to: **Mr. James Bodnar, Director, Human Resources, Mohawk Data Sciences, Dept. CW, 7 Century Dr., Parsippany, NJ 07054.**

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MDS MOHAWK DATA SCIENCES

Building on the Theory of Productivity

Production Support Supervisor Data Processing

abc

Fine opportunity for a self starting professional with a minimum of 5 years data processing experience which includes strong operations background and the ability to manage highly technical groups. Individual will be responsible fort supervising a 12 hour shift (6PM-6AM) within our production support group and will need excellent oral and written communication skills in addition to the ability to deal with all levels of management. Our ideal candidate will also have heavy experience in OS/JCL, MVS, JES 2, JCL, utilities and software problem solving as well as experience with distributed data processing and maintenance of remote satellite locations.

We offer a generous salary, complete fringe benefits and, most importantly, a progressive atmosphere where professional career growth is encouraged.

Please send resume with salary history and requirements to Keith Sowul, Personnel Administrator, American Broadcasting Companies, Inc., Continental Plaza III, 433 Hackensack Avenue, Hackensack, New Jersey 07601. Men and Women of all races are encouraged to apply.

American Broadcasting Companies, Inc. abc

PROGRAMMER ANALYST

We are seeking a qualified individual in software development. Work experience should include 2-3 years in COBOL programming and one year in systems design preferably in an on-line DOS/VSE environment. Minimum of 2 years Associate's Degree desired.
This career opportunity offers excellent advancement potential in an expanding department, excellent salary and benefits. Interested candidates should send resume, in confidence, to EDP/Personnel:

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PROGRAMMER/ANALYST: Project leader and senior. Minimum of three years programming experience required. Inventory management, accounting, billing and barcode applications using COBOL, DL1, CICS, DMS and VSAM on IBM 4341 DOS/VSE. Degree a plus.

SYSTEMS PROGRAMMER: Opportunity to architect your own systems environment. Knowledge of DOS/VSE, CICS/VSE and POWER/VS internals and SYSGEN experience required. DL1 and DMS desirable. Remote telecommunications a plus.

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Geophysical Software Professionals

When the largest domestic oil producer in the U.S. opens a new Geophysical Data Center in Dallas, that's news. The oil and gas industry has known for some time that Sohio Petroleum Company uses its strong financial position as the basis for an aggressive exploration and lease acquisition effort and that same base enables our expansion into this new service center. This start-up operation means challenge and opportunity for you of an unparalleled nature, with visibility like you have never had.

Programmer/Analysts
Analysts
Technical Programmers

Professionals with an educational background and previous experience in the geophysical programming discipline will play a major role in Sohio's effort to establish itself as the industry leader in technology.

Previous experience with DEC equipment, especially VAX-11/780 computer systems, is a definite plus. Candidates should possess at minimum a BS in Computer Science, Geophysics, or related discipline, and have a minimum of two years experience in geophysical software development.

A variety of software openings exist in the following areas:

☐Geophysical software development using FORTRAN
☐Geophysical R & D applications software
☐Seismic data analysis software

It's time to consider joining the Sohio adventure where the pay and benefits are outstanding. This is a ground floor opportunity to participate in the start-up operation for this new Geophysical Data Center. The opportunity for good visibility is unequaled and—to top it off—Sohio has one of the best relocation programs in the industry to make your move comfortable. Send your resume to Tammy King, Sohio Petroleum Company, One Lincoln Centre, Suite 1300, Dallas, Texas 75240, or call (214) 960-4227.

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Southwestern energy corp.; 5 years minimum DP, 2 years as project leader; mfg. and financial applic., IMS DB/DC, MVS, TSO/SPF, degree required. CALL COLLECT.

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SYS ANAL. (BANK/S&L) $30,000 RANGE
International banking services in attractive Deep South locale; 5+years banking /S&L applications, project leadership, user contact required. NCR 8500, VRX, NEAT III'. Degree strongly preferred. Dynamic, fast track company, CALL COLLECT.

SR. PROGRAMMER/ANALYST $28-30,000
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(901) 761-4560 EOE M/F/H

STATE OF ALASKA OFFICE OF THE GOVERNOR

THE DIVISION OF BUDGET AND MANAGEMENT IS RECRUITING FOR AN EDP SYSTEM PROGRAMMER/ANALYST

This position is responsible for the maintenance of the Division's existing budget system and economic analysis software, and for the construction, installation and documentation of additional software as new requirements are identified.

The position requires current or very recent experience in writing both batch and on-line software in an IBM mainframe environment involving the following: PL/1, COBOL, CMS, CICS, OS-MVS, VSAM and JCL. Training and/or experience using ABADAS, RAMIS II, DMS, LIBRARIAN and SNA would be helpful.

Applicants should have experience in consulting with data processing system end-users and converting their automated data processing requirements into working software.

Applicants should also be capable of operating independently in defining, organizing and completing assignments.

The salary for this position ranges from $31,680 to $39,120 per year depending upon training and experience.

This position is located in the capital city of Juneau, a coastal community with population of approximately 20,000.

Individuals possessing the qualifications described above who are interested in being considered for this position are invited to send their resumes to the Division of Budget and Management, Office of the Governor, Pouch AM, Juneau, Alaska 99811. Resumes should be received in Juneau by May 17, 1982.

The Office of the Governor is an equal opportunity employer.

SENIOR PROGRAMMER ANALYST

Medical Applications
-San Jose Based-

For us, utilizing state-of-the-art technology begins at home. We're San Jose Hospital, one of the West's largest non-profit medical facilities, located in the midst of the high technology frontier — California's Silicon Valley.

We've taken the latest technological advances in on-line computer systems and applied them in the operation of our impressive medical facility. With our recent initiation of a major system utilizing PL-1 language, we are currently seeking qualified individuals to take over its implementation and maintenance.

You must have 6 plus years' experience, preferably with a hospital on-line system, know PL-1 and other high level languages.

Not only is this an ideal opportunity to get in on the ground floor of a project you can make your own, you can also enjoy the benefits of living in one of the nation's most desirable areas — the beautiful Santa Clara Valley. To learn more about this outstanding positon, which includes flexible hours and a very excellent salary and benefits package, call Mary Mayes COLLECT at: (408) 292-7844, or send a letter/resume to her attention at: San Jose Hospital, 675 E. Santa Clara St., San Jose, CA 95112. EOE.

San Jose Hospital

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Responsible for designing and developing software running in an intelligent terminal for the enhancement of work processing capabilities.

The ideal candidate will have a B.S. in Computer Science, or equivalent or 2 or more years of experience in top-down design, problem analysis, high-level design and detail programming experience in IBM Assembler, Z-80 Assembler or UNIX "C" language. Detailed knowledge of VM/CMS is highly desirable.

SOFTWARE SUPPORT ENGINEERS

Responsible for complete software support of the operating system for an intelligent terminal.

The ideal candidate will have a B.S. degree in Computer Science, or equivalent and 2 or more years experience using IBM Assembler, Z-80 Assembler and VM/370.

Detailed knowledge of IBM OS or DOS internals, COBOL compiler or word processing internals is highly desirable.

SOFTWARE TEST ENGINEERS

Responsible for developing software tests for intelligent terminals.

The ideal candidate will have a B.S. in Computer Science, or equivalent, and two or more years experience using IBM Assembler language developing diagnostic tests for peripheral devices. Detailed knowledge of teleprocessing protocols such as SDLC, SNA, Asynchronous, Bisynchronous, X.21 and X.25 and experience using Z-80 Assembler is highly desirable.

TECHNICAL EDITOR

Responsible for editing documents from draft to final copy, according to pre-determined department operating procedures. Duties include proofreading and checking documents to insure that appropriate format style and grammar is followed and maintain the standard publications' style guide.

To qualify, you should have a B.A. in English or Journalism or equivalent experience; one or more years experience in technical editing; knowledge of data processing software languages and terminologyand communications skill to effectively interface with Software Technical Writers.

For immediate and confidential consideration, please send your resume, including salary history to:

PARADYNE CORPORATION
Professional Staffing Dept. #201
P.O. Box 2826
Largo, FL 33540

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COMPUTER SYSTEMS DEVELOPMENT
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DIVISION OF COMPUTING RESEARCH
CANBERRA ACT AUSTRALIA

CSIRO has a broad charter for research into primary and secondary industry areas. The Organization has approximately 7,500 employees - 2,700 of whom are research and professional scientists - located in divisions and sections throughout Australia.

The Division of Computing Research operates an Australia-wide computer network to provide a computing service to CSIRO, government and other users throughout the country. Major host computers include a CDC Cyber 76, a CDC 730, a FACOM M-190, two FACOM M-150s and a two Pi V32, and services are offered using the CDC operating systems SCOPE 2 and NOS/BE. FACOM OSIV/54 and IBM VM370/CMS. Host computers are connected to each other and to the long distance packet-switched network by a local high speed contention network using NSC's HYPERchannel.

In addition to its service role, the Division undertakes innovative research and development in: Operating Systems, Communications, Image Processing and Graphics, Systems Modelling, Data Base Systems and VLSI architecture.

As Leader of a Research & Development Group, the appointee will assist the Chief in the guidance and coordination of various research and development projects. The appointee will be expected to take a leading role in the formulation, initiation and conduct of research within selected projects.

Applicants should have a PhD degree or equivalent in computing science or a related field, a substantial record of research achievement and the ability to provide scientific leadership to a number of research groups. Extensive experience in communications and systems software development would be an advantage.

This is an indefinite appointment which carries Australian Government superannuation benefits, subject to normal conditions.

Dr P J Claringbold, Chief, Division of Computing Research would be pleased to discuss the position with potential applicants and receive advice concerning this appointment from people with a particular interest in it.

Applications in writing and stating full personal and professional details, with the names of at least two referees and quoting reference No. A1977 should reach:

The Chief
Division of Computing Research
CSIRO
P.O. Box 1800
CANBERRA CITY ACT 2601
AUSTRALIA
by May 24th., 1982.

Home Petroleum Corporation and Denver . . . Growing Together.

Home Petroleum Corporation is an expanding and dynamic part of Denver's oil and gas industry. We offer the experience of a well established parent company, plus the exciting growth potential of a new successful affiliate company headquartered in downtown Denver. Our success is dependent upon our fine team of professionals. If you are a qualified professional, interested in joining our team, we have an immediate opening for the following position:

MSA ANALYST/PROGRAMMER

This position will be responsible for the MSA Payroll/Personnel System, including the ERISA Benefits Module; Life-to-Date History Module; and MSA bulletin update maintenance. The successful candidate must have 2-3 years of MSA Payroll Personnel on-line experience, as well as experience using COBOL, DOS/JCL, and Easytrieve.

Home Petroleum Corporation offers an excellent compensation and benefits package. If you are interested in both challenge and excellent growth potential and you possess the above qualifications, please send your resume and salary history in complete confidence to:

Corporate Recruiter
HOME PETROLEUM CORPORATION
999-18th Street, Ste 601
Denver, CO 80202
(303) 628-5000

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Computational Analysis Corporation
Personnel Dept.
3860 E. 34th St.
Tucson, AZ 85713

LEXINGTON, KY

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Programmer with a background in:

- Burroughs B2890
- Multi-bank processing
- COBOL
- Experience with Florida Software systems a plus

Salary to 25K or commensurate with experience

Send resume to:
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Lexington, Kentucky 40509
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IS SEEKING THE FOLLOWING ADDITIONS TO ITS MIS STAFF:

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Minimum of four years data processing experience. Degree preferred. Experience in lieu of degree.

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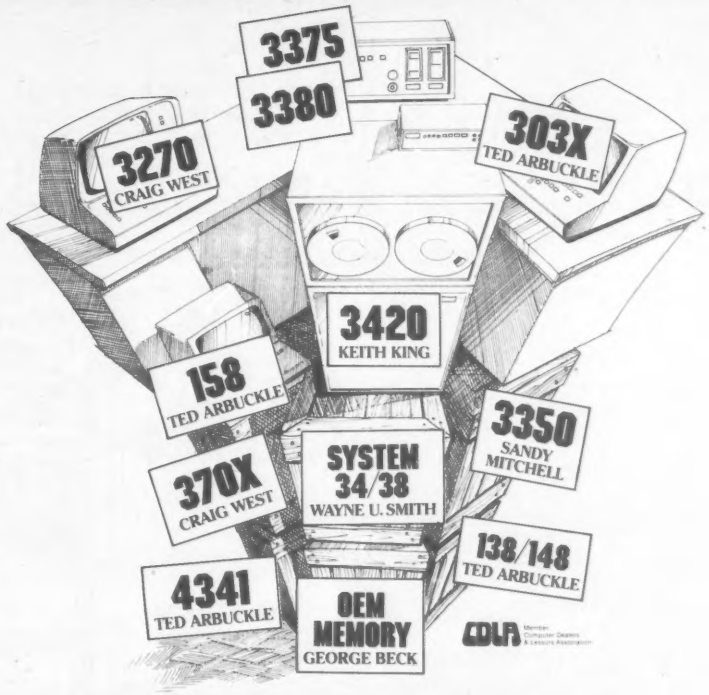

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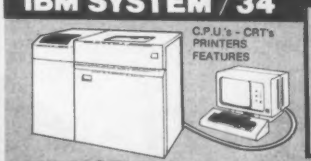

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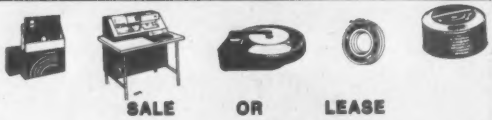

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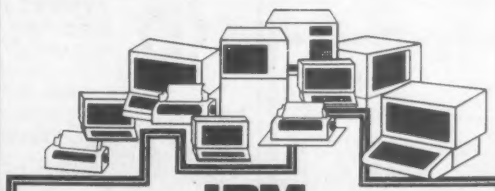

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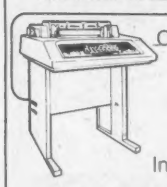

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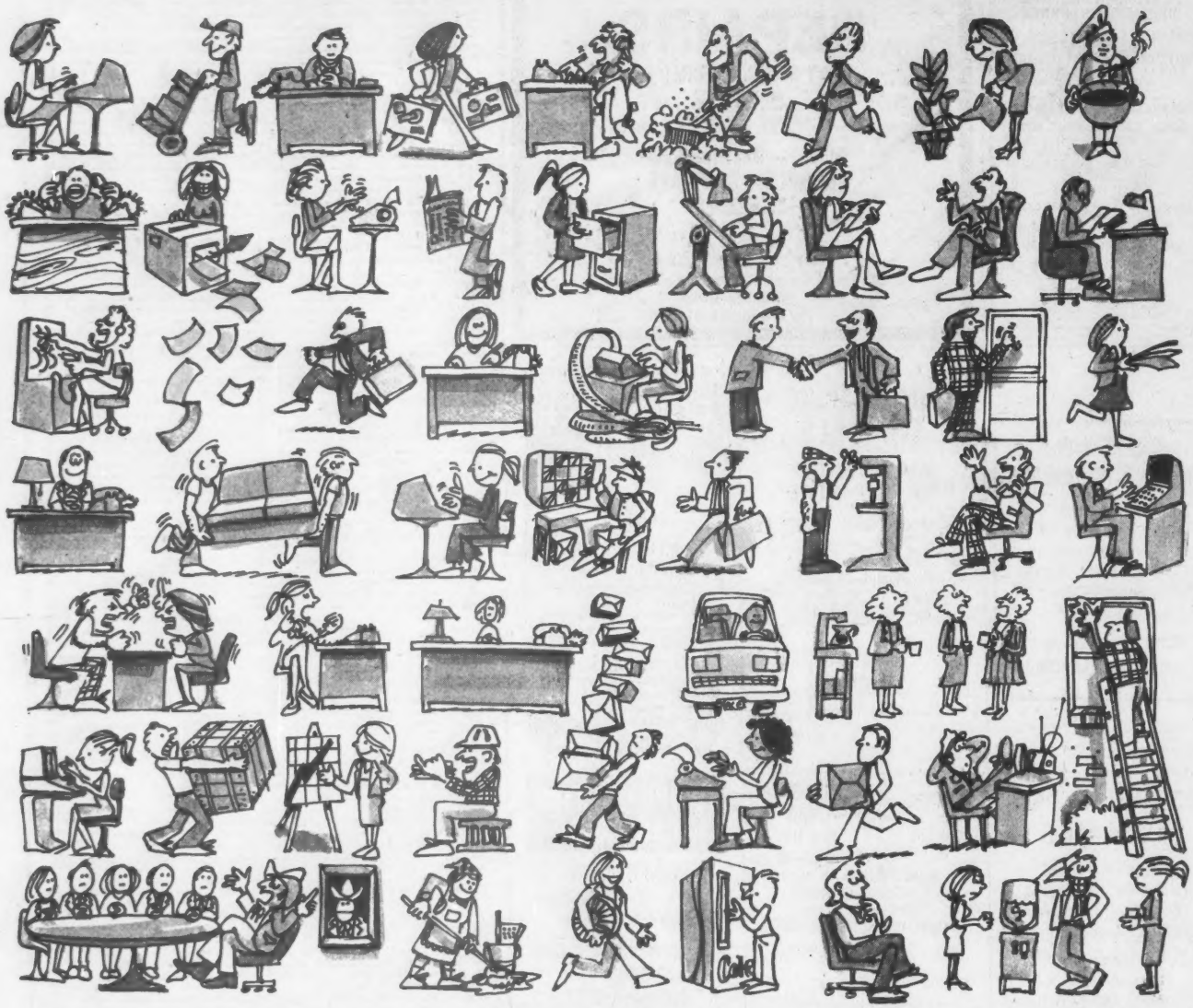

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